ROADS and STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HE UCTION

Gillette Publishing Co., 23 West Maple St.
Chicago 10, Illinois

OCTOBER 1955

The Push Loaders Worked Uphill

Concrete Paving For Big Bombers

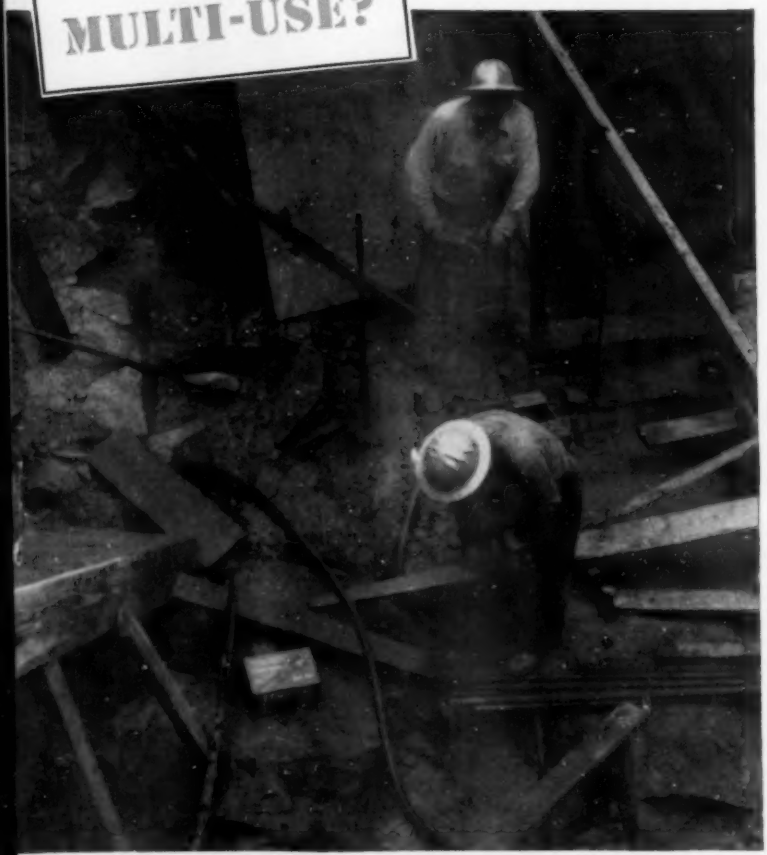
See page 4 for contents

Accepted as Controlled Circulation Publication at Cedar Rapids, Iowa

UNIVERSITY MICROFILMS
R6
EUGENE B. POWER
313 N. 1ST ST.
ANN ARBOR, MICH.
60MP-LRV-11-50

CARBIDE INSERT? OR MULTI-USE?

TIM bide insert bits give more r bit through blocky granite on Granite Falls Fishway



THE Scheumann & Johnson Company of Seattle had to drill blast and dowel holes in extremely hard, seamy granite when constructing baffles for the world's largest "vertical-baffle" salmon fishway at Granite Falls, Washington. For highest economy drilling through this hard ground, they chose Timken® *carbide insert* bits for the job.

Timken carbide insert bits permitted high speed drilling with minimum bit changes. And the job superintendent reports that the Timken carbide insert bits made it possible to drill out full increments of drill steel.

But Timken carbide insert bits may not be the best answer for *all* your drilling problems!

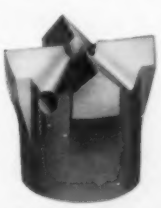
In softer, less abrasive ground, Timken *multi-use* bits, correctly controlled and reconditioned, give you the lowest cost per foot of hole when you can drill out full increments of drill steel.

Both types of Timken bits are interchangeable in the same thread series. And a wide range of different Timken bits fit the same drill steel. When the ground changes, you can switch bits quickly and easily, right on the job.

The Timken Rock Bit Engineering Service can offer you over 20 years of experience in recommending the best bit for the job. We'll be happy to help you. Write: The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

LOCATION: Granite Falls, Washington.

OPERATING CONDITIONS: Drilling of blast and dowel holes in hard, seamy granite.



Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

your best bet for the best bit ... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

P&H Model 655-B, 1½-yd. capacity. P&H builds the world's most complete line of Power Cranes and Shovels.

P&H ...20 YEARS AHEAD with welded construction!

Think of it! . . . 20 years ago P&H threw out the old patterns to give you a new and better kind of power shovel — *completely welded of rolled alloy steels!*

Twenty successful years in the field have proved beyond all doubt the advantages you gain through greater strength and the elimination of dead weight. Today's P&H machines give you faster cycles, still more dependable service — still lower yardage costs. Behind today's machines is P&H's long experience in welded design and construction — still 20 years ahead of the field.

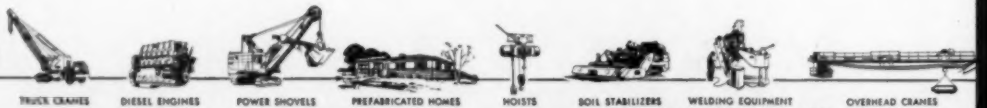
All-welded construction is only one of many major improvements originated by P&H. There are others that will earn you more money than is possible with older style machines you may now be using. Get the facts from your nearest P&H dealer. P&H Power Crane and Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wis.

HARNISCHFEGER

See your P&H dealer

"Your P&H Dealer has the experience, the organization and the facilities to serve you reliably in every way. He's ready to deliver the kind of on-the-ground service that keeps your jobs moving on schedule. Your P&H Dealer is tops in the business. Get to know him."

the P&H *Line*



. . . for more details circle 210, page 16

Two New Expressways to Untie Traffic Congestion in Detroit

Completion of two new expressways criss-crossing downtown Detroit will relieve the urgent traffic congestion problem in that city's metropolitan area. In addition, the expressways will greatly reduce time and inconvenience in traveling to and from the suburbs.

The John C. Lodge Expressway will run north from Jefferson Avenue for a distance of nine miles. The Edsel Ford Expressway will extend fourteen miles from the western to the eastern city limits.

Both expressways are designed to carry all types of traffic, with a capacity of 9000 vehicles per hour. Cross traffic is carried on overhead bridges, and there will be no traffic lights or grade intersections. The new highways have a minimum of three 12-ft traffic lanes in each direction, a 14-ft medial strip, two 8-ft refuge lanes, and two 30-ft service drives where necessary. Interchange ramps are placed at approximately ¼-mile intervals.

Bethlehem supplied steel for various already completed sections of the Ford-Lodge Expressways, and is in addition supplying steel for other portions now under construction. Among the Bethlehem steel highway products being used in the expressways are dowel units, reinforcing steel, and structural steel for bridges and overpasses.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

. . . For more details circle 185, page 16

THIS *is the*

CLAMP...

That is easiest to attach; provides strong, full-circumference grip on the hose; and can be used again and again . . . always with same sure holding power.

"KING"
SINGLE *and* DOUBLE BOLT
HOSE CLAMPS

Made of tough, durable malleable iron . . . completely rustproofed. Full-width tongue between reinforced bolt lugs prevents pinching and damaging hose. Bolts are carefully machined and threaded for maximum ease of application.

Single bolt style, sizes ⅞" to 5¼"; double bolt style, sizes 3½" to 17¼".

Double Bolt

Stocked by Manufacturers and Distributors of Industrial Rubber Products

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BRANCHES—CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON
DIXON VALVE & COUPLING CO. LTD., TORONTO Associate Companies
Bucklen Company, Inc., Quarryville, Pa. · Precision Drawn Steel Company, Camden, N.J.

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ROADS AND STREETS
Sixty-Three Years of Editorial Leadership

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Accepted as Controlled Circulation Publication at Cedar Rapids, Iowa.
Published monthly. Subscription price $5.00 per year.

WATER AND RUBBER JOIN FORCES

PREPARING SITE FOR 6,500,000-YARD DAM!

THEY TOOK A TIP FROM THE FORTY-NINERS at Cherry Valley Dam in California's Sierras — for much of the overburden clung to slopes too steep for equipment. So they washed it down into the valley with high-pressure water jets, which also were used to wash out fines (as shown above). Then crawlers and the following rubber-tired equipment took over — 15 scrapers, 35 haulers, 3 water trucks, 3 compactors, 14 pickups, 2 grease trucks, 3 flat-bed trailers and a couple of tank trucks. The mountain goats would hardly know the old place now!

BIG TIRE STOCK PILE ON JOB speeds changes for inspection and maintenance.

You find "Goodyear is there" on more and more jobs where the going is rugged—and there's no time for down time. That's because Goodyear tires, always tough brutes, are now more enduring than ever—for they're made with Goodyear's triple-tempered 3-T Nylon Cord!

The 3-T process, exclusive with Goodyear, stabilizes Nylon cord at its most bruise-resistant, heat-resistant point. It controls tire growth, reduces tread and body failures to new LOWS — keeps tires in shape for *extra* re-lugs and recaps. Next time you buy or specify any type tire, remember only Goodyears have 3-T Nylon Cord!

Goodyear, Truck Tire Dept., Akron 16, Ohio

HARD ROCK LUG

HARD ROCK RIB

ALL-WEATHER

SURE-GRIP

FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE!

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

And Remember

NOTHING ELSE CAN TAKE IT LIKE

3-T NYLON!

Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

. . . for more details circle 209, page 16

Bigger, faster loads with the new LOWBOWL SCRAPERS

18 CU. YD. STRUCK
25 CU. YD. HEAPED

How Caterpillar's new, exclusive LOWBOWL design pays off for you!

Compare these two scrapers – the new No. 470 with LOWBOWL design and the sideboarded No. 21.

Both scrapers were loaded with the same material under identical conditions.

Result: the No. 470's net load weighed 5000 pounds *more* than the load in the No. 21–which is a profitable margin in favor of LOWBOWL design.

The LOWBOWL concept features a bowl that has been widened and lengthened, and bowl depth has been decreased. Incoming material, meeting less overhead weight and internal friction, is loaded with less resistance clear out to the end of the loading cycle.

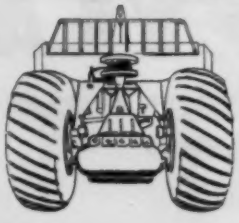
Result: faster loading for LOWBOWL design. Both the No. 470 and No. 456 feature this new concept in scraper engineering.

New No. 470 Scraper (left) with 5000 pounds more load than sideboarded No. 21 Scraper (right).

"BIG PRODUCTION" FEATURES

MORE POWER—300 HP at 1800 r.p.m. Ten per cent more rimpull. New 6-cylinder Cat Engine. Requires only one operating adjustment. Fan-belt tension regulated by convenient setscrew-adjustment of generator.

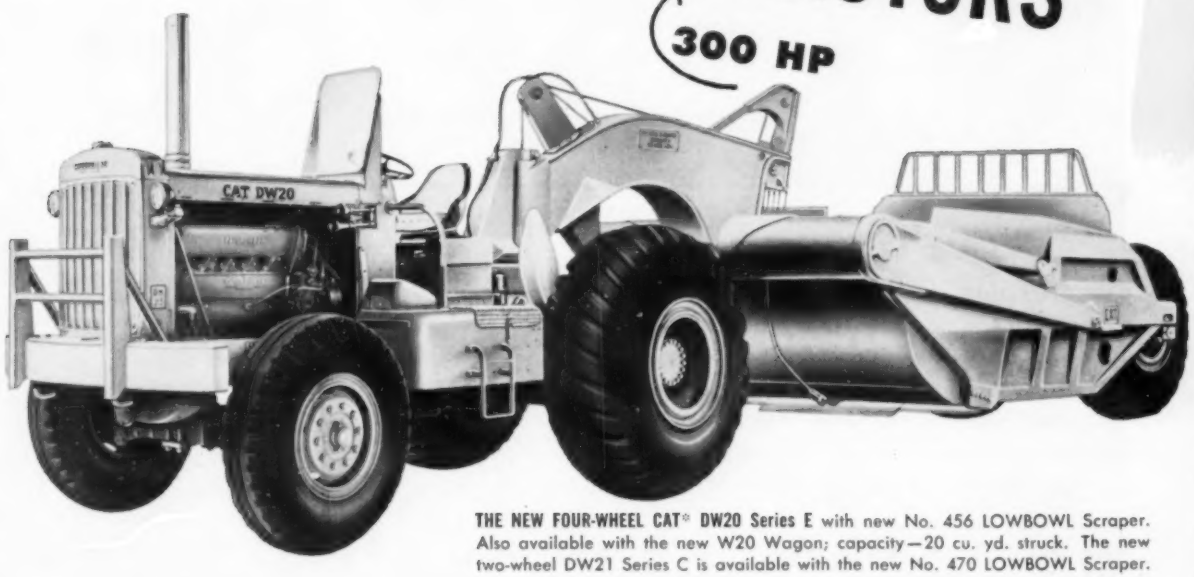
NEW TURBOCHARGER, driven by engine exhaust, utilizes energy which would otherwise be lost. Packs air into engine according to engine load, not speed. Delivers more working HP—greater performance.



NEW, BIG WIDE-SECTION 29.5-29 TIRES, developed after 3 years of Caterpillar and tire manufacturer research on actual earthmoving jobs, operate at lower pressures and provide greater flotation and traction.

LARGE AREA PUSHBLOCK gives better pusher contact, faster loading.

More power, bigger capacity in the new DW20-DW21 TRACTORS



THE NEW FOUR-WHEEL CAT* DW20 Series E with new No. 456 LOWBOWL Scraper. Also available with the new W20 Wagon; capacity—20 cu. yd. struck. The new two-wheel DW21 Series C is available with the new No. 470 LOWBOWL Scraper.

In the DW20 Series E and DW21 Series C, Caterpillar offers you two new tractors and matched scrapers with exclusive LOWBOWL design.

Replacing the DW20 and DW21, world-famed earthmoving pace-setters, these new machines are built to deliver a new standard of money-making performance.

Their new LOWBOWL design utilizes maximum tractor and pusher power for bigger loads, faster loading times. Their greater power means faster cycles.

For complete facts, see your Caterpillar Dealer!

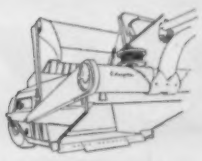
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NEW DW20-DW21, LATEST EXAMPLES OF LEADERSHIP IN ACTION

OF THE NEW DW20-DW21



INCREASED HIGH APRON LIFT provides faster ejection of any material.

INCREASED SCRAPER GROUND CLEARANCE enables units to work even under extremely "soft" conditions.

HIGH SPEEDS FOR FAST HAULS
DW20 Series E, 2.8 to 32.1 m.p.h.
DW21 Series C, 2.3 to 20.5 m.p.h.

CHOICE OF STARTING METHODS, optional 24-volt direct electric or gasoline starting engine with 6-volt starting motor.

AUTOMATIC CABLE SAVER, standard equipment.

PLUS IMPROVED BRAKE CONTROL, more easily removed DW20 hitch arrangement, better protected DW21 hydraulic steering system and many other new and thoroughly tested Caterpillar features.

. . . for more details circle 188, page 16

WHERE THERE'S DUST ...MARFAK'S A MUST

DON'T LET dust ruin your bearings—give them complete protection, longer life with *Texaco Marfak*. This world-famous chassis lubricant stays *in* the bearings, keeping dust and dirt *out*. It guards against wear and rust, prolongs bearing life, reduces maintenance costs.

In wheel bearings, use *Texaco Marfak Heavy Duty*. It seals out dirt and moisture, seals itself in — assuring safer braking and protection that lasts for thousands of extra miles, with no seasonal change needed.

More than 555 million pounds of Texaco Marfak have been sold.

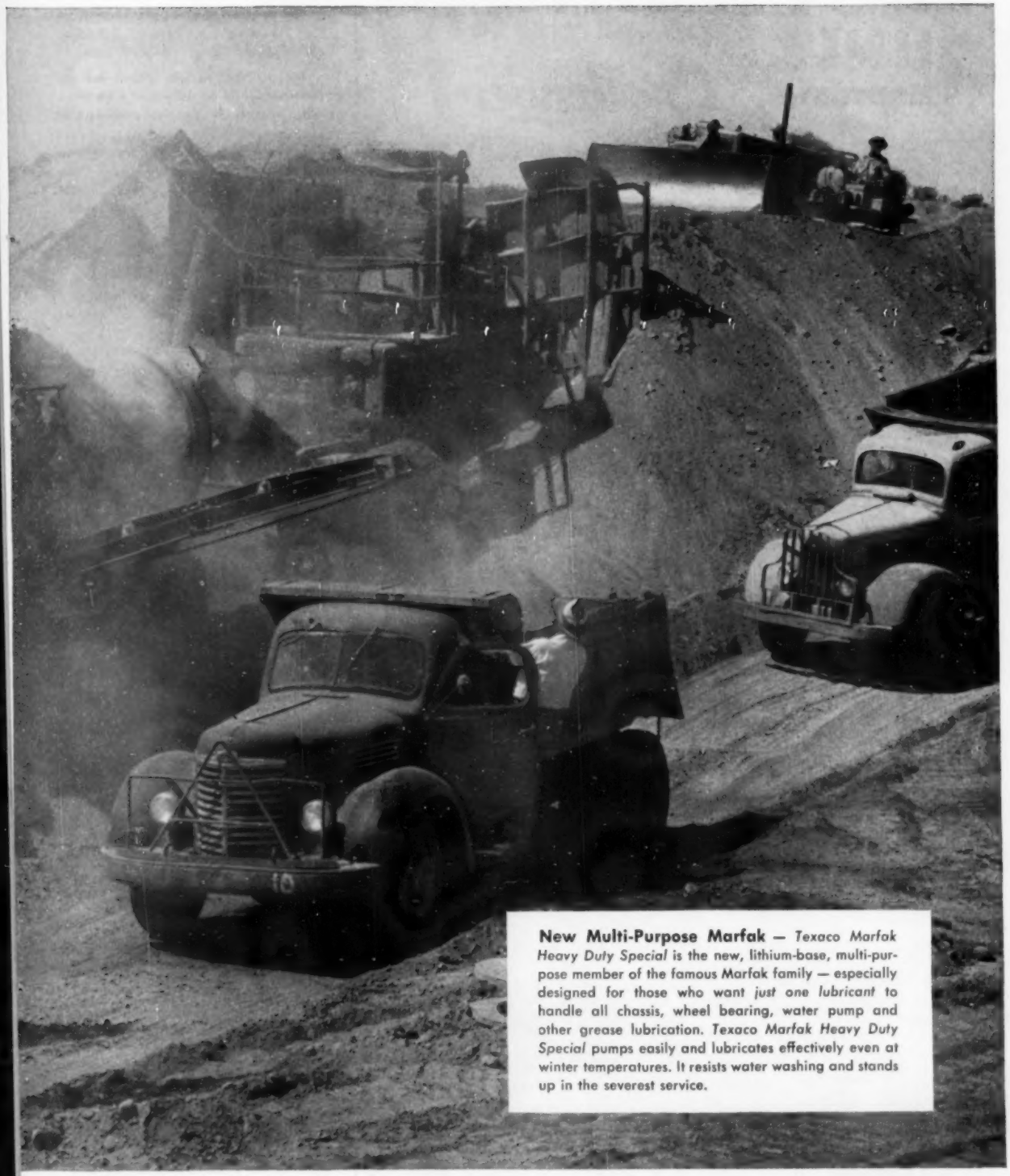
For transmissions and differentials, use *Texaco Universal Gear Lubricant EP*. Gears will run better, smoother, longer . . . at lower maintenance cost.

On crawler mechanisms, *Texaco Track Roll Lubricant* affords constant protection against mud and moisture, keeps bearings rust-free, checks wear.

TEXACO SIMPLIFIED LUBRICATION PLAN. Saves time and money, eliminates errors, reduces lubricant inventory — because *no more than six* Texaco Lubricants are needed to handle all major lubrication. Get complete details from your Texaco Lubrication Engineer. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN . . .
TEXACO STAR THEATER
starring
JIMMY DURANTE
on television . . .
Saturday nights, NBC.

TEXACO



New Multi-Purpose Marfak — *Texaco Marfak Heavy Duty Special* is the new, lithium-base, multi-purpose member of the famous Marfak family — especially designed for those who want *just one lubricant* to handle all chassis, wheel bearing, water pump and other grease lubrication. *Texaco Marfak Heavy Duty Special* pumps easily and lubricates effectively even at winter temperatures. It resists water washing and stands up in the severest service.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

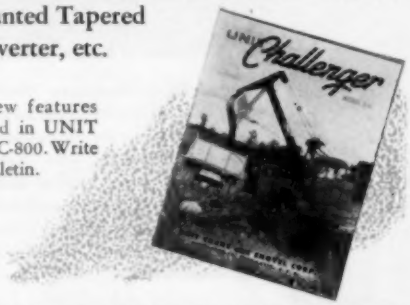
. . . for more details circle 239, page 16

UNIT
MODEL 510

THE NEW UNIT *Challenger* . . . as a DRAGLINE

NOTHING BUT THE BEST! There's no substitute in the ⅜-yard excavator field for EXPERIENCE. UNIT has it! UNIT knows what you need in a ⅜-yard machine . . . knows how to engineer the power, over-all performance-superiority and economy of operation for the jobs you want to do profitably with a ⅜-yard dragline, clamshell, crane or trenchoe. The New UNIT CHALLENGER proves this with such features as: Self-aligning Hook Shoes . . . Force Feed Lubrication . . . Full Floating Trunnion-Mounted Tapered Drums . . . Torque Converter, etc.

See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



UNIT CRANE & SHOVEL CORP.
6407 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!

. . . for more details circle 243, page 16

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 63 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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Check 'Em!

ONLY ADAMS Motor Graders have all these time and money-saving advantages

8 Forward Speeds

✓ Provide the "right" speed for every operation and a higher travel speed. Save time—reduce costs.

4 Reverse Speeds

✓ Up to 13 mph. . . . Save valuable production time backing on short stretches, between forms, etc.

3 "Creeper" Speeds

✓ ¼ to 1¾ mph. (optional). Use full engine power while gearing grader to slow-speed operation.

Rubber-Mounted Engine

✓ Floating power—no engine vibration transmitted to grader. Increases operator efficiency.

Dual Braking System

✓ Service brake applies hydraulic braking action to transmission as well as wheels. Quicker, safer stops.

Foot Accelerator

✓ Permits operator to drive grader as naturally as truck or automobile. Safer handling in traffic.

New Heavy-Duty Constant-Mesh Transmission

✓ Easy, positive gear shifts at all speeds . . . Heavy construction with helical gears on roller bearings for quietness and long life. The finest ever put into a motor grader.

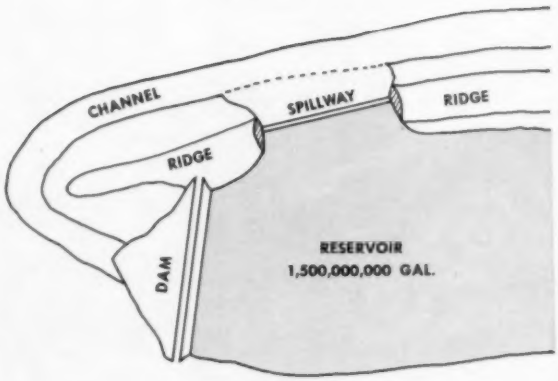
A Product of Adams Division • **LeTourneau-WESTINGHOUSE Company** • **Peoria, Illinois**

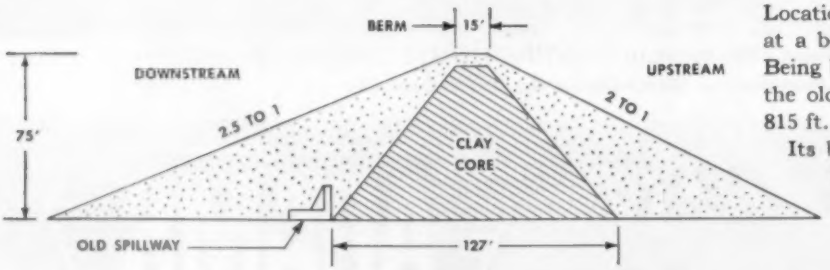
Subsidiary of Westinghouse Air Brake Company

Make your next motor grader an

ADAMS

A year ago the work area you see above was the site of a near-disaster. Due to prolonged drought, the 50-million gallon reservoir which supplied Sylacauga, Ala. became completely emptied. For 3½ months, 15,000 people were forced to rely on tank trucks and a nearby spring for their water. Textile, foundry, and quarry industries had to cut production. Fire danger was extremely high. By next year, though, this danger will be just an unhappy memory. A new dam will impound over 1½ *billion* gallons of water in a 170-acre, 50-ft. deep reservoir. This will assure the city and its industries of enough water for 8 months, regardless of rainfall.





Location of the dam is between two hills at a bend in a winding stream channel. Being built over the concrete spillway of the old dam, the new structure will be 815 ft. long and 75 ft. high.

Its base will be 353 ft. wide; its top berm, 15 ft. Some 215,000 yds. of compacted clay will form the core; 13,000 tons of native marble, the rip-rap face.

Payscraper speed helps complete 1,500,000,000 gallon reservoir 60 days ahead of schedule

If you'd like to know more about the abilities of International's new Model 75 Payscraper, just ask Ed Bentley, veteran Sylacauga, Alabama contractor.

Mr. Bentley has been using two of these 18½-yard self-propelled scrapers for a season now. He reports they "handle better than any other scrapers I have ever had."

"LOAD FAST, WORK FAST"

"My two Payscrapers," he says, "definitely exceed our expectations in every respect. They load fast, haul fast, and spread fast. My operators like their ease of operation and comfort. I like their day-after-day trouble-free performance."

Pictured is one of Bentley's latest Payscraper jobs—helping move 250,000 cubic yards for a reservoir dam for the city of Sylacauga. Used with a fleet of three International TD-18's, a TD-24, and a Galion grader, the two Payscrapers here combined to average 2,000 to 3,000 pay yards per day. Cycles, averaging 5,000 feet, took about five minutes. This high speed, day after day, week after week, helped Bentley complete work in four months—well under the 180 days allowed in his contract.

CALL FOR A DEMONSTRATION

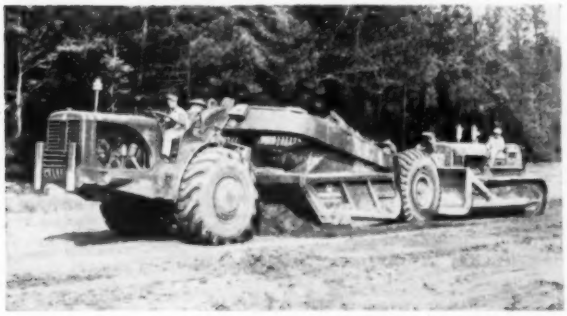
Let us show you this 18½-yard "75"—or the smaller 13-yard "55" Payscraper—in action on your job. Call your International Industrial Power Distributor to arrange time and place.

IMPORTANT CHANGES HAVE BEEN MADE

In the past year, International's research and manufacturing staffs have greatly improved the "75" Payscraper. They have raised power to 262 hp (17½ "horses" per yard of struck capacity). They have increased heaped capacity to 18½ cubic yards *without sideboards*. They have strengthened transmission, differential, and final drive, boosted rim-pull, and made over 80 more changes to boost output and lower downtime. If *you* want top efficiency in a rubber-tired scraper, you'll want to check the new Payscrapers. Do it now.

INTERNATIONAL HARVESTER

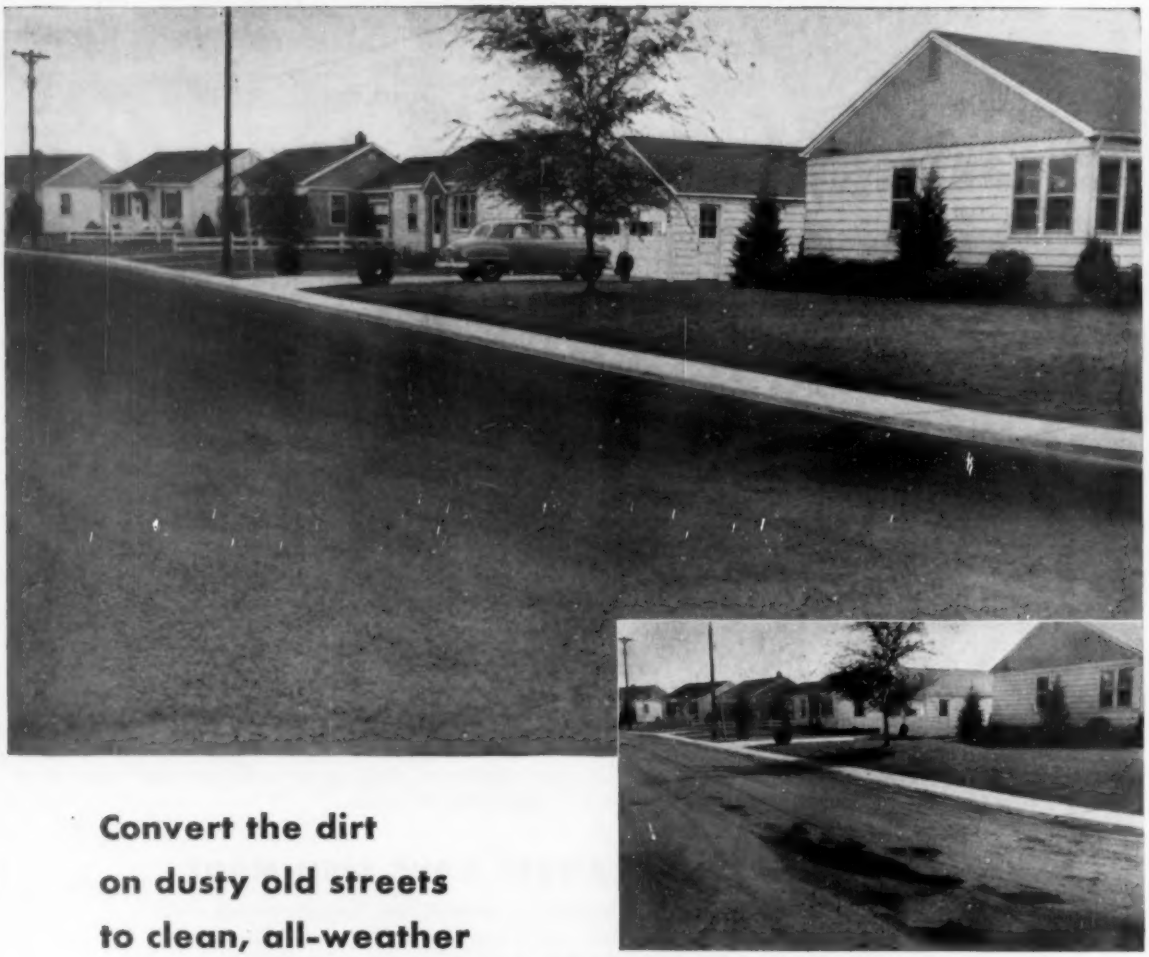
INDUSTRIAL POWER • MAKES EVERY LOAD A PAYLOAD



Contractor Bentley reports his 161 dhp TD-24 consistently loads 18½-yard Payscrapers in 35 to 40 seconds. "The '24' and my other IH crawlers are my top producers." says Bentley.

. . . for more details circle 214, page 16

Payscraper's open-top speeds loading from TD-9 tractor-shovel. Material is muck—part of 35,000 yards stripped from old dam site by contractor's four TD-18's and 24's.



Convert the dirt on dusty old streets to clean, all-weather pavements with *SOIL-CEMENT*

Dusty, muddy or dangerously potholed streets can be turned easily and quickly into clean, all-weather pavements with soil-cement.* The "before and after" photos above are striking evidence of this transformation.

Usually the scarified granular material of the old street constitutes the "soil" of the new soil-cement base. Since scientific controls were first developed 19 years ago to assure dependable soil-cement performance a long list of materials have been used successfully in soil-cement pavement. These include cinders, clay, caliche, sand, gravel, shale, slag, chat, marl, chert and scoria.

Converting worn-out streets into all-weather soil-cement pavement is quick and easy. Though scientifically controlled, the process is simple and construction and maintenance crews can learn the operations quickly.

Because paving is fast and simple and because about 85% of the required material usually is soil on the site, soil-cement pavement is economical. It's durable too. Practically all the soil-cement pavement built since 1935 is still serving in all parts of the country under temperatures ranging from 40° below zero to 100° above and under precipitation from arid to more than 60 in. of rainfall per year.

For more information about how to build this low-cost, all-weather pavement for residential streets write for free literature. It is distributed only in the U. S. and Canada.

*Soil-cement pavement consists of soil-cement base and bituminous surface.

PORTLAND CEMENT ASSOCIATION 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

. . . for more details circle 230, page 16

How Link-Belt Speeder engineering helps both the shovel-crane and the operator

increase earning capacity!

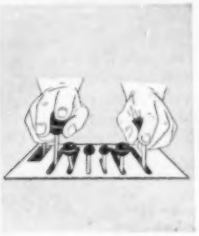
LS-98 with 60′ boom and 1¼ yard bucket works in sand and gravel pit.

You're ahead on every job —Link-Belt Speeders—whether crawler or rubber-tired—are years ahead of the shovel-crane industry. Only Link-Belt Speeder offers you Speed-o-Matic—the true power hydraulic fingertip control system. Only Link-Belt Speeder offers you so many outstanding design, construction and operator advantages. For facts on every machine in the ½ to 3-yd, 10 to 60-ton work range—contact your Link-Belt Speeder distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

13.948

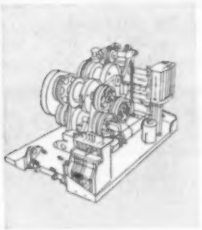
. . . for more details circle 222, page 16

Two-way speed increase



● Speed-o-Matic, the true power hydraulic control, provides fast, easy, smooth response . . . ideal control *for speed with accuracy*. It's also engineered to *reduce operator fatigue* — enables him to maintain greater output with less effort.

Extra power, stamina



● Anti-friction bearings, splined shafts and precision-machined surfaces at every important point convert more *rated* hp into actual line pull. All-welded, stress-relieved construction permits use of extra power.

More work-time

● Speed-o-Matic reduces operator fatigue, losses due to end-of-the-shift letdown. Further, it minimizes downtime. For example, Speed-o-Matic clutch is hydraulic actuated, self-compensating. Eliminates frequent stops for adjustment.

A demonstration can be arranged to suit your convenience. See one of these great machines in action and judge for yourself why they are today's most advanced shovel-cranes.

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes

WHAT'S NEW in Equipment and Materials

High Abrasion Resistant Electrode

A new hard-facing electrode developed especially for use where high corrosion and high abrasion at elevated temperatures are encountered, has been announced by Mir-O-Col Alloy Co., 312 N. Ave., 21, Los Angeles 3, Calif. Trade named Mir-O-Col No. 11, this electrode retains virtually all its characteristics at red heat, and produces a smooth, bright, non-oxidized deposit free from all porosity. It flows readily to clean base metal, giving minimum penetration. It is a high cast alloy rod of the non-ferrous type, containing cobalt, chrome and tungsten, with a Rockwell C hardness 50-52 as deposited and is especially suited for hard facing valves, tongs, chemical equipment and food machinery equipment.

Due to its high hardness, Mir-O-Col is recommended where only moderate impact is encountered. Application can be made by either acetylene or electric AC-DC. Under normal conditions electric deposits are slightly lower in hardness than acetylene deposits.

For more information circle 101 on Service Coupon this page and mail now.

Reversing Transmission for Ford Tractors

A reversing transmission for use on Ford tractors, introduced by Sherman Products, Inc., of Royal Oak, Mich., is claimed to add new convenience and speed in operations where reverse speed is as important as forward speed. By providing for five forward and five reverse speeds, the unit enables fast shuttle operations of the tractor for maneuvering into position or working with front-end equipment.

Specially designed for use with the Sherman fork lift attachment or with loaders, scrapers and dozer blades, the new reversing transmission incorporates the same speeds in reverse as those now available in forward gear. Constant mesh, helical gears and anti-friction type bearings are used throughout the unit. The new Sherman reversing transmission has been engineered for quick and easy installation on Ford tractor models 640, NAA, 2N, 8N, and 9N.

For more information circle 102 on Service Coupon this page and mail now.

4-Wheel Drive Units

Improved new Power-Pak 4-wheel drive units for ½, ¾, 1, 1½ and 2-ton Chevrolet and GMC trucks have been announced by Napco Products Division, Napco Industries, Inc., 834 North 7th St., Minneapolis, Minn. The manufacturer states that Power-Pak equipped trucks will climb up to 7% grades effortlessly, and they can haul heavy payloads through all kinds of mud, sand or snow-choked roads. According to Napco engineers, installation of the Power-Pak requires no frame cutting, nothing to weaken or distort the chassis. They point out that it is a simple matter to remove the Power-Pak unit and re-install it on later model trucks. Repair and service facilities are available at every Chevrolet or GMC dealer.

For more information circle 103 on Service Coupon this page and mail now.

New Photo Copying Process

Reflex photocopies of opaque originals and originals printed on both sides can now be made on diazo-process printers (Ozalid, Bruning, and similar machines) by using a yellow filter, in a procedure developed by Peerless Photo Products, Inc., Shoreham, L.I., New York, especially for this purpose. With this filter, a sheet of Peerless "Dri-Stat" "Bright-Light" No. 1 (negative) paper is exposed with the original in any diazo-process printer and a negative obtained. The image on this negative is then transferred to a positive sheet in a separate processing unit, using "Dri-Stat" processing solution and a sheet of "Dry-Stat" No. 2 (positive) paper.

This procedure will give a single copy of the original, when the positive sheet used is standard 005 100-gram paper. But it is also possible to use this proceedure for making copies in quantity, by transferring the image to a positive sheet of DRI-STAT translucent vellum, a thin 003 55-gram stock. Such a translucent positive copy makes an excellent intermediate which can be used as a "master" on a white-print or blue-print machine for running off as many diazo-process copies as may be desired.

For more information circle 104 on Service Coupon this page and mail now.

More equipment news pages 103-110, 123-127

Paint for Construction Equipment

A chemical-resistant coating called Speed-Rex is available, in a wide choice of colors, to contractors for painting of construction equipment. It has a gloss finish and can be sprayed or brushed. It is fast drying, making it possible to paint equipment one day and place it in use the day following. The coating is especially adapted to cement handling equipment and trucks as it is highly resistant to abrasion and to the caustic and corrosive effects of Portland cement mixtures. Manufactured by Truscon Laboratories, 1700 Caniff, Detroit, Mich.

For more information circle 105 on Service Coupon this page and mail now.

For more items . . . see page 103

MAIL THIS COUPON TODAY!

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

CIRCLE THE NUMBERS AND MAIL NOW!

Please send me further information on products and materials mentioned in the October Roads & Streets as circled below

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NOT GOOD AFTER NOVEMBER 15, 1955

A READER SERVICE FOR YOUR NEEDS

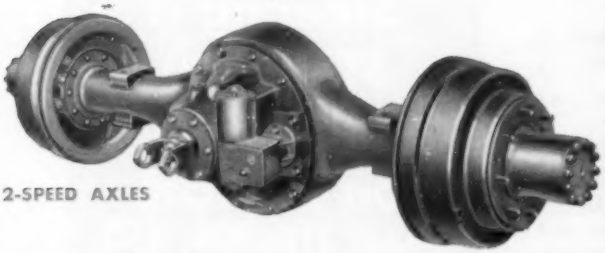
EATON is a Famous Name in Motor Truck Axles

FRONT AXLES

TANDEM DRIVE AXLES

SINGLE-REDUCTION AXLES

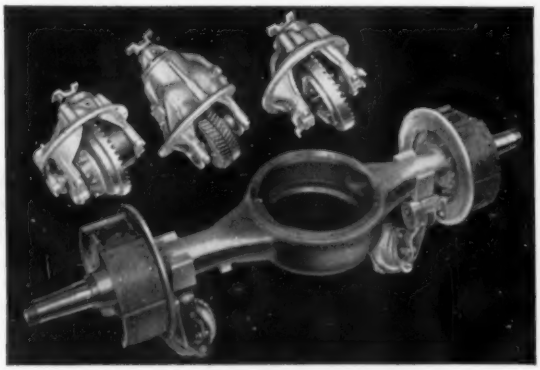
DOUBLE-REDUCTION AXLES



2-SPEED AXLES

This rugged housing, used in famous Eaton 2-Speeds, is also used for Eaton single-reduction and double-reduction axles. The three types of heads are interchangeable.

EATON experience and engineering know-how are reflected in the outstanding performance records, minimum hauling costs, and long life of more than two million motor trucks. As a pioneer motor truck axle manufacturer, Eaton's aggressive engineering has been responsible for a number of fundamental advancements in axle design and production — particularly in the field of 2-Speed axles and tandem drive units.



EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

. . . for more details circle 199, page 16

GALION
HYDRAULIC BOOSTER STEERING

NO "WHEEL FIGHT"
--you will enjoy steering!

Galion Motor Graders with hydraulic booster steering do more and better work because the operator will do a better job of maneuvering the grader.

- **Steer with practically no effort.**
- **Combines the confident "feel" of manual steering with the ease of power steering.**
- **Complete easy control at all times.**
- **Steering wheel tugging is eliminated, shocks are absorbed. Less operator fatigue.**
- **GALION gives you the safest and most dependable of all grader steering systems.**
- **Hydraulic booster steering is STANDARD EQUIPMENT on Galion Models 118, 104, 450 Motor Graders.**

B & L ELEVATING GRADER ATTACHMENT

The speedy, low cost method of casting, stripping, loading and terracing.

***Hydraulic Booster Steering is* STANDARD EQUIPMENT *on* GALION Models 118, 104, 450 MOTOR GRADERS**

ESTABLISHED GALION 1907

MOTOR GRADERS · ROLLERS

TRENCH ROLLERS · PORTABLE ROLLERS · 3-WHEEL ROLLERS · TANDEM ROLLERS · MOTOR GRADERS

THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.
Cable address: GALIONIRON, Galion, Ohio

. . . for more details circle 404, page 16

ROADS AND STREETS
Sixty-Three Years of Editorial Leadership

Washington News Letter

By Duane L. Cronk

October 8, 1955

Federal highway legislation is far from a dead issue in Washington these autumn days. The President's illness seems not to have affected the outlook. Highway people are catching their breath and exploring what can be done to assure adoption of a big roadbuilding program next Congressional session. In anticipation of a knock-down-and-drag-out struggle when the lawmakers convene in January, here is what is shaping up:

● Highway user interests, the wide segment of the economy represented in the National Highway Users Conference, will plan a campaign for the next few months at a New York City meeting this month.

● Automobile manufacturers and dealers, also this month, will get together in Washington to determine what their industry can do to aid the good roads cause.

● State highway officials, represented by the AASHO, served notice last month that they will settle for no compromise in the size of the proposed roadbuilding program Uncle Sam should launch.

* * * *

● Highway contractors, members of the Associated General Contractors of America, will also formulate policy this month for its position in any new push for federal legislation.

● Motorists, nearly 5 million strong represented by the AAA, warned in Washington last month that they will pressure for an immediate start on the National Interstate System; completion wanted within 15 years, with federal aid financing out of existing taxes.

● The President, in a telegram to AAA conventioneers, urged motorists to "speak up again and again for prompt action" on highway legislation.

● Truckers, assembling in Washington this month, are expected to propose again that they will go along with an "across the board" increase in motor fuel taxes and tires and a boost in the truck excise tax from 8% to 10%. The American Trucking Associations maintains that its proposals were never given a chance for debate on the floor in Congress last session, but that they would yield very nearly as much money as Fallon's defeated bill.

● Congressmen, watching straws in the wind, are already announcing their intentions to propose compromise financing measures that will enable construc-

tion on the scale necessary. Several have said they will support measures financing a program half by bonds and half by new taxes.

Roadbuilding is moving toward a new record high this year. The BPR has estimated that governments at all levels will put $7,552 million into streets and highways in '55.

Although road revenues will also reach a new level - $300 million more than last year - expenditures will exceed income for the first time in the last decade. One reason: Few big toll road bond issues have been marketed this year - some $800 million worth compared to $2.2 billion worth in 1954. All other revenues are up.

New construction will account for $4.6 billion this year, or $600 million over 1954. Roadbuilding is up 20%, reports an AGC survey.

* * * *

The shortage of cement for roadbuilding in some areas this season has moved the Bureau of Public Roads to give it special study. Officials were asked last spring if the cement industry had the capacity to provide for the proposed roadbuilding program, and more recently Congressmen have pointed to cement shortages and argued that there is not enough for an expanded highway construction program.

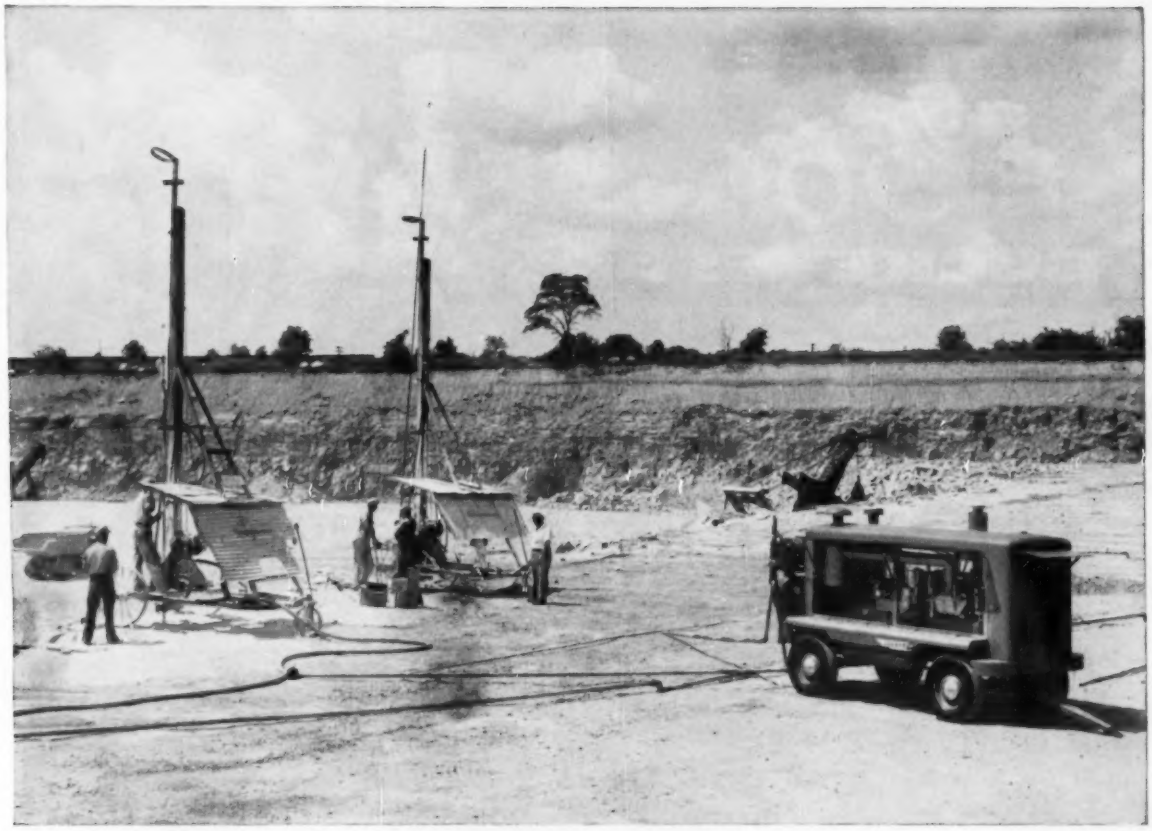
Last year the cement industry's 157 plants produced 294 million barrels, - 19% for roadbuilding. Expansion plans already under way will boost the plants to 165 before next season and capacity to 308 million barrels. The industry has assured Congress it will expand to meet the needs of any program adopted.

* * * *

One of the most revealing reports recently issued by the Highway Research Board is Circular 286. It indicates how widespread the state highway department effort to beat the engineering shortage. A survey which HRB took this summer reveals that in administration, planning, location, design, materials, maintenance and other areas, highway officials are developing numerous shortcuts to ease the staff engineering work load.

Significant time savings are being realized through the use of modern electronic equipment and photogrammetry. Top efficiency is being sought through administrative techniques and in-service training, and the work load of the staff engineer is being lightened through use of sub-professionals and employment of consulting engineers.

In the face of the acute engineering manpower shortage, such activities take on special significance. The successful administration of any increased highway program may depend largely on how energetically state highway departments pursue this problem.

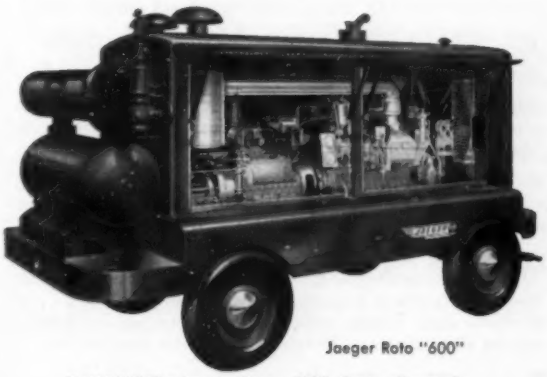


DRILLING 70′ TO 80′ OF 3″ HOLES PER HOUR IN HARD LIMESTONE, ON 7 GALLONS OF FUEL: Marble Cliff Quarries, one of Ohio's largest, is using this Jaeger Rotary 600 on these two quarry rigs with 4″ drills and air tugger hoists to drill 19′ holes of 3″ final diameter in hard flux limestone. Because of the constant, unfluctuating 100 lbs. pressure maintained by the Jaeger Rotary, each drill averages 350′ to 400′ per 10-hr. day. The compressor never runs faster than 1600 rpm, with a resulting minimum of wear and fuel consumption of only 7 gph.

Jaeger offers a fully efficient rotary "600"

In more than a year of use, on all types of big air work, the Jaeger Roto "600" has demonstrated two outstanding advantages over other rotary compressors. (1) *It operates at slower speeds*, resulting in lowest fuel consumption and longest life of engine and compressor. (2) It maintains 100 lbs. minimum pressure under all normal operation, *as smooth as steam*. Speed modulation is stepless over the entire operating range, and so instant-acting as to prevent any over-run and racing of engine. Controls are also extremely simple.

Jaeger also offers more efficient oil cooling, closer control of engine water temperature, elimination of cold weather "dry starts", 8-hour fuel tanks, wrap-around bumpers and many other advantages. For complete information, see your Jaeger distributor or send for Catalog JCR5.



Jaeger Roto "600"

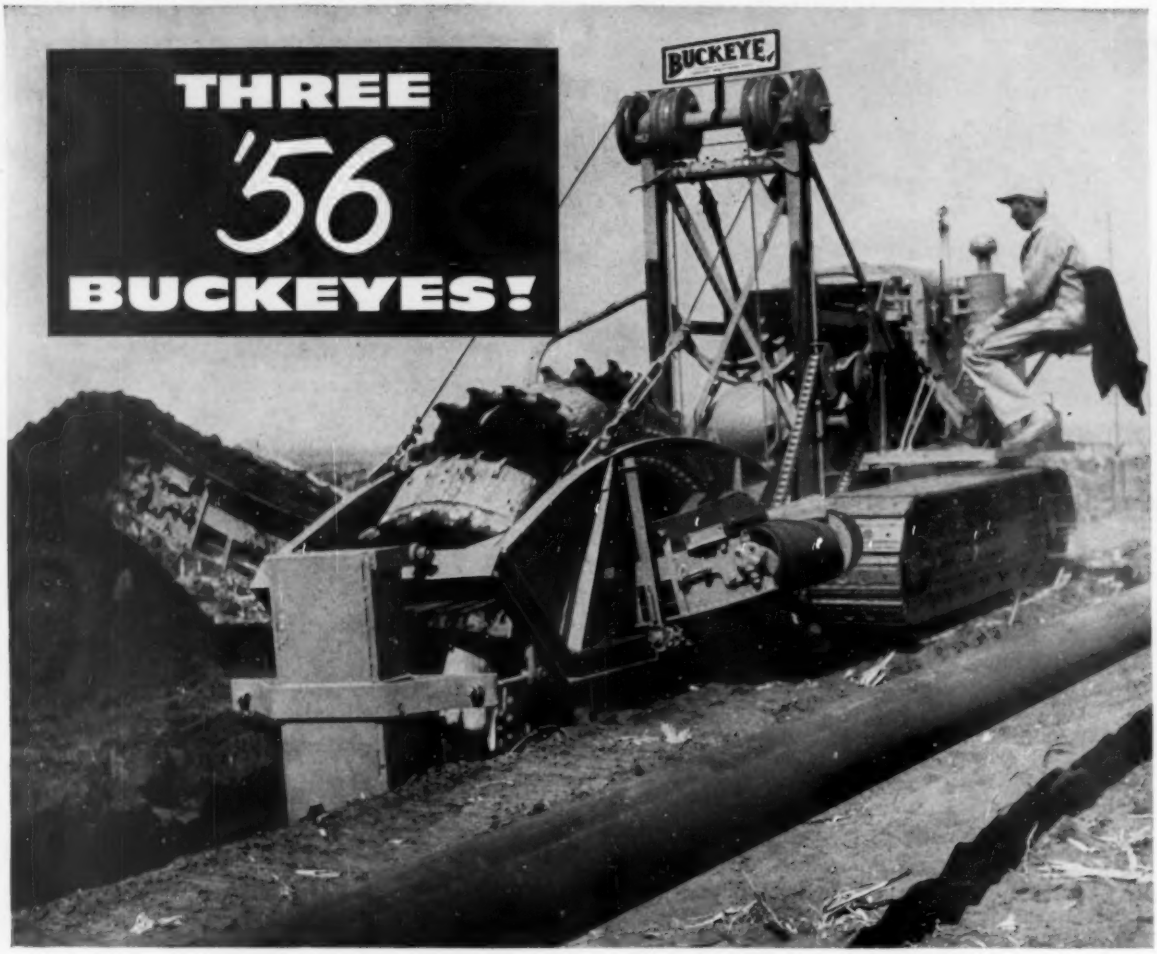
Model "125" rotary is also available for smaller work.

THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

PUMPS • LOADERS • MIXERS • TRUCK MIXERS • PAVING MACHINES

. . . for more details circle 216, page 16



...Alive with big features from Wheel Hoist to Crawlers

Buckeye's new "O" series now includes 3 models, the 305, 307 and 308 — each one with new, exclusive features for smooth, clean, low-cost ditching — each one built to outperform any machine in its class!

Live Hydraulic Wheel Hoist!

For faster, more accurate positioning of digging wheel independent of all other functions. Easily operated from the seat by simple, one-hand controls. Lets operator work faster, more profitably!

Hydraulic Conveyor Drive!

Forward or reverse in 3 speeds to meet any conveyor need . . . Eliminates shock damage found when driven mechanically from digging wheel drive . . . Completely controllable from the seat.

Tractor Type Crawlers!

Allow variation in tread width and bearing areas thru a selection of pads specifically suited to any type digging . . . Idler rollers have face-type seals for long life . . . Strong, sturdy and reliable!

See the New "O" Series

BUCKEYE

...at Your Distributor!

Product of GAR WOOD GW INDUSTRIES

No. 55268

. . . for more details circle 205, page 16

Most Modern Design!
Most Modern Power!

Get both in new Chevrolet Task-Force trucks. Modern styling that actually works for you! Modern power in the shortest stroke V8's* in any leading truck!

Styling that's designed to make money for you—It's a fact. The ultra-modern, Powermatic design of a new Chevrolet Task-Force truck calls attention to your business, favorably impresses customers and prospective customers! That's why on looks alone a Task-Force truck can make money for you. And it's *functional* styling. Panoramic windshield, new High-Level ventilation, concealed Safety Steps—these are styling features that double in brass to make the driver's job less of a chore. With safety and comfort increased, efficiency goes up. Tight schedules are easier to maintain and you keep the profits coming in on time.

V8 power—unmatched for efficiency!—Chevrolet brings you the industry's most advanced short-stroke V8 engines! The compact, super-efficient design of these great V8's reduces friction and wear . . . delivers a higher output per pound of engine weight. You save on upkeep and operating costs! And with a modern 12-volt electrical system, you get double the voltage for quicker starting plus a greater reserve of electrical power. *With two power-packed V8's and five gas-saving 6's—it's the greatest engine choice in Chevrolet truck history!* See your Chevrolet dealer for details. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

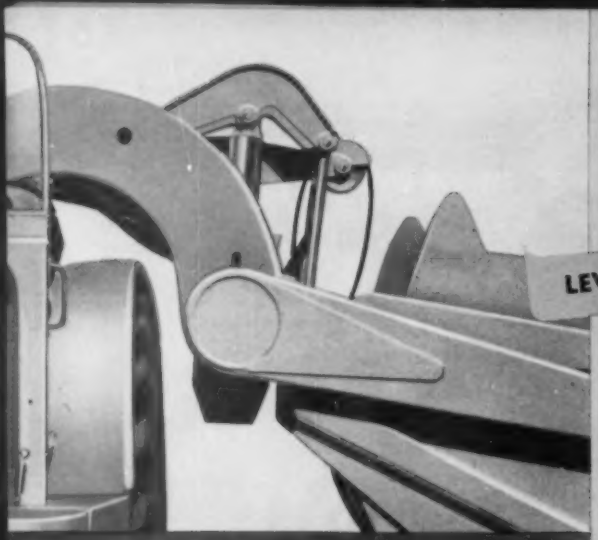
**V8 standard in the new L.C.F. models, an extra-cost option in all others except Forward-Control models.*

NEW CHEVROLET *Task-Force* TRUCKS

CHEVROLET

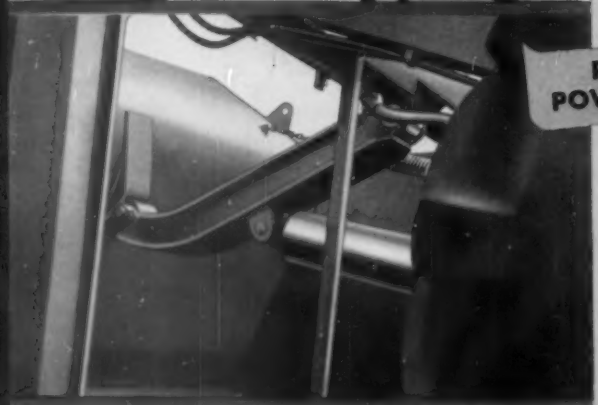
. . . for more details circle 206, page 16

Here's the New



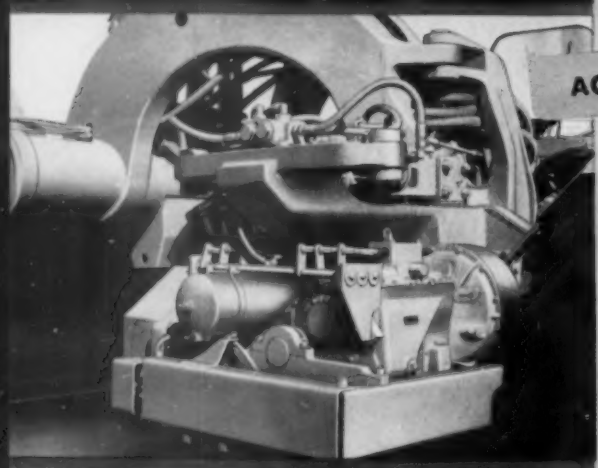
LEVER ACTION

Lever action, an exclusive Euclid feature, does away with cable headaches for good . . . only 12 ft. of cable used for the apron lift. All scraper operations, bowl, apron and ejector, are actuated by levers with independent hydraulic control . . . they're fast and positive . . . not interconnected in any way. All four of the hydraulic jacks are interchangeable . . . one spare fits anywhere!



ROLL-OUT POWER EJECTOR

Roll-out power ejector is independently controlled—dumps capacity loads, even wet, sticky material, fast and clean. Maximum power is available at start of the dumping operation when it is needed most. Cam and roller action speeds up ejector action near the end of the dumping operation. High apron lift permits fast, free ejection of big loads.



ACCESSIBILITY

Accessibility of major components — engine, clutch, transmission and drive axles—is a time saving, cost cutting feature of the S-7 design. Repairs or replacement do not require a major disassembly job. Removal of components takes about half the time required for other small scrapers. Easy servicing and maintenance keeps down time to a minimum—means more payloads per hour.

FOUR SECTION CUTTING BLADE

A four section cutting blade provides most efficient loading in any material. Each section is reversible and interchangeable to give longer life and permit the straight or drop center blade arrangements best suited for job requirements. A new cutting edge for any blade arrangement can be obtained by simply reversing or interchanging the sections.

S-7 "Euc" Scraper

This "Euc" S-7 is the newest addition to Euclid's Scraper line—fastest growing line in the industry because of customer acceptance and preference. It incorporates many of the features that have made larger Euclid Scrapers tops in production and efficiency . . . and has greater accessibility than any previous "overhung" scraper on the market.

Built to Euclid's standards of rugged construction for long service life, the S-7 is engineered throughout for good accessibility of all major components, for fast loading and travel, and for ease of operation. The entire power train—engine, clutch, transmission, planetary drive axle, etc.—is easy to get at for servicing, repair or replacement. This is a mighty important cost cutting feature in a single axle prime mover.

Before you buy your next small scraper, check the profit making features of the S-7. Your Euclid dealer can show you how this new "Euc" can get more work done at lower cost than any other scraper of comparable size.

POWER and PERFORMANCE

With 143 h.p. this 7 yd. "Euc" has power and performance that's unequalled in small scrapers. . . 20 h.p. for every yard of capacity . . . 18.00 x 25 tires . . . and a top speed of 25 m.p.h. with full payload.

MANEUVERABILITY

Maneuverability—so important for close quarter work—is excellent with the S-7. Full power steering and hitch design of the two-wheel tractor provides a 29 ft. non-stop turning radius. The 18.00 x 25 or 21.00 x 25 (optional) tires have large rolling radius for good traction and flotation.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

for more details, circle 207, page 16

LIMA Type 803 equipped with a 24'-6" boom, 18'-0" dipper handle and 2½ cu. yd. dipper. The Type 803 has gained world-wide recognition for its dependable performance and big output at low operation and maintenance cost.

LIMA'S fast service cuts costly downtime

From coast-to-coast Lima service engineers, warehouses and distributors are prepared to give you that extra-fast service or parts delivery which can make all the difference between continuous, profitable production and high-cost idleness of equipment.

When you buy a LIMA you can depend on long, trouble-free service, thanks to those extra quality features built into every LIMA. But if trouble happens and you need help, you get it from Lima . . . fast!

COMPARE QUALITY! No other machine gives you as much as LIMA!

1. Piston ring type dirt seal rings and retainers in crawler rollers.
2. Moving parts are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation.
4. Anti-friction bearings at every vital bearing point.
5. Big capacity drums and sheaves are easy on cables.
6. Propel and swing gears and power take-off are enclosed in a sealed oil bath.
7. Torque converter (optional on certain types).
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

BALDWIN-LIMA-HAMILTON

Construction Equipment Division · LIMA · OHIO · U. S. A.

. . . for more details circle 183, page 16

for more details circle 207, page 14

BROS tip sheet EXTRA

BROS ROTARY SNOW PLOW LOADS 5-YARD TRUCK IN 30 SECONDS; CASTS 50 FEET IN ANY DIRECTION

MOUNTS ON INDUSTRIAL TYPE TRACTOR LOADERS, GRADERS AND JEEPS

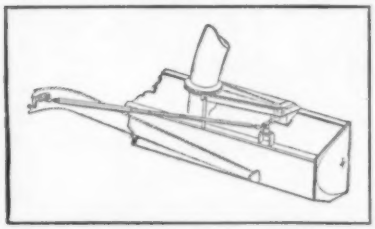
SNOW BELT, U.S.A. The big news in this part of the country is single lane loading of windrowed snow with the Bros Series "A" Sno-Flyr. This powerful rotary snow plow loads a 5-yard truck in less than 30 seconds — or where convenient — tosses tons of snow up to 50 feet away.

That's really getting snow off the streets fast and it's done without snarling traffic; the Sno-Flyr's casting chute is rotated directly forward to load truck straddling windrowed snow. The whole operation is performed up to 10 times faster than by bucket loader and without jockeying back and forth for loading position.

Heavy, wet snow is hurled by the ton into waiting line of trucks on Luverne, Minnesota's Main Street. Normal traffic is quickly resumed after heavy March snow fall. Bros Series "A" is mounted on Ford Major tractor with Wagner loader. Dozens of snow belt cities report enthusiastic approval of this plow's great performance.

MOUNTS ON MOST INDUSTRIAL-TYPE TRACTORS

The Bros Series "A" mounts on almost all front-end hydraulic bucket loader attachments with 1,000 lb. capacity. It is easily installed by the same bucket pin connections. Hydraulic lift arms permit plow to knock down drifts up to 10 feet high, chewing them down layer by layer. No other comparable rotary can work on deep drifts so effectively.



BALL BEARING MOUNTED CASTING CHUTE

Ball bearing mounted casting chute is turned from the tractor cab, providing you with directional control of snow ejection through 180 degree arc. Positive control for "spot casting" in confined areas.

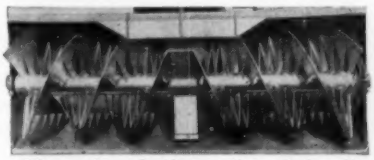
The Series "A" Sno-Flyr's segmented "finger joint" chute capper permits you to adjust height of snow stream, just like crooking your finger. And an optional longer chute which is interchangeable with capper is available for loading trucks.

BROS SLIT-SPIRAL ROTOR-FEED RAKE

A close look at the Series "A" slit-spiral rotor-feed rake shows you the world famous Bros Sno-Flyr design. It rapidly gorges wet, heavy and chunky snow as well as fresh fallen snow; small stones and street debris do not hamper its operation.

The non-clogging rotor-rake feeds the snow to casting chute, as rapidly as moldboard area fills, hurling it up and out.

Rotor's cutting height is 30 inches. Oscillating type runners provide ground contact.



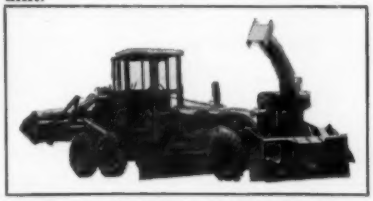
The unique knifing action of the slits prevents packing of snow around the rotor hub; snow is moved up to 7 tons per minute in a constant, even discharge.

Three plowing widths are available: 4' 4", 5' 6", and 6' 6". With only a 30 hp engine, the Series "A" performs the work of much bigger units and with equal efficiency.

MOUNTS ON OTHER TYPES OF EQUIPMENT

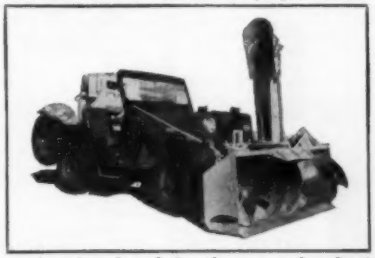
Besides mounting on most industrial type tractors, the Bros Series "A" Sno-Flyr mounts on popular makes of self-contained front-end loaders. Such equipment is thus kept on a year 'round working schedule.

Road patrol graders and crawler tractors, too, use the powerful Bros Series "A". Hydraulic arms for scarifier on grader are used to attach snow plow unit.



FOR 4-WHEEL DRIVE JEEPS

A special undercarriage push frame and hydraulic lift are used to mount the Series "A" on 4-wheel drive jeeps. Plow's engine is placed in the rear for best weight distribution. This unit is sold nationally through Jeep distributors.

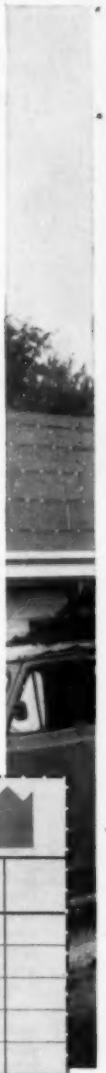


You'll find the Bros Series "A" Sno-Flyr the best operational plow for solving municipal snow removal problems. It is especially effective in cramped working areas. Get complete information and a demonstration from your nearest Bros distributor. Or write: The Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave. S.E., Minneapolis 14, Minnesota.

. . . for more details circle 187, page 16

GET SE

FOR Big Jobs Ahead



Genuine profit and efficiency gains await the contractor who gets set now for big jobs ahead. Here are a few of them:

More time to compare and analyze equipment more carefully and thoughtfully.

More time to work out financing details without delays.

A chance for your men to become more familiar (and more productive) with new equipment before it goes on tight-schedule jobs.

Opportunity to give new equipment its "shakedown" runs before big, fast-moving jobs begin.

Greater availability of equipment. Greater assurance of getting all front-end equipment you need before the rush starts.

Greater availability of erection men to work closely with your men in assembling and training.

P. S. "Get Set Now" is good advice on your present MARION equipment — review your replacement parts needs — get genuine MARION parts ordered now so you'll really be set for the jobs ahead.

MARION POWER SHOVEL CO. • MARION, OHIO

Gentlemen: Please send literature on sizes of machine checked.

MACHINE	SHOVEL CAP. CU. YD.	SHOVEL BOOM LENGTH (EFF.)	HANDLE LENGTH (OVERALL)	MAX. CRANE BOOM LENGTH	MAX. CRANE RATING IN TONS @12' RAD. EXCEPT AS NOTED CRAWLER	TRUCK	WAGON	HOE CAP. CU. YDS.	ASK FOR BULLETIN NUMBER
MARION 32-M	¾	19'-6"	16'-4"	80'-0"	*17½	*25	*25	¾	416
MARION 43-M	1	22'-6"	16'-4"	100'-0"	*27	*35	—	1—1¼	415
MARION 362	1½	24'-8"	18'-2"	100'-0"	37	—	—	1½—2	398-D
MARION 372	—	—	—	100'-0"	43	—	—	—	—
MARION 83-M	2	24'-8"	18'-2"	120'-0"	60	—	—	2—2¼	414
MARION 87-M	—	—	—	140'-0"	75	—	—	—	—
MARION 93-M	2½	27'-4"	20'-0"	120'-0"	80	—	—	—	397-E
MARION 101-M	3	27'-4"	20'-0"	120'-0"	84	—	—	—	417
MARION 111-M	4	32'-0"	23'-8"	120'-0"	169	—	—	—	402-B

*Rated at 10' Radius in Accordance with General Practice.

THIS COUPON can help you start to get set RIGHT.

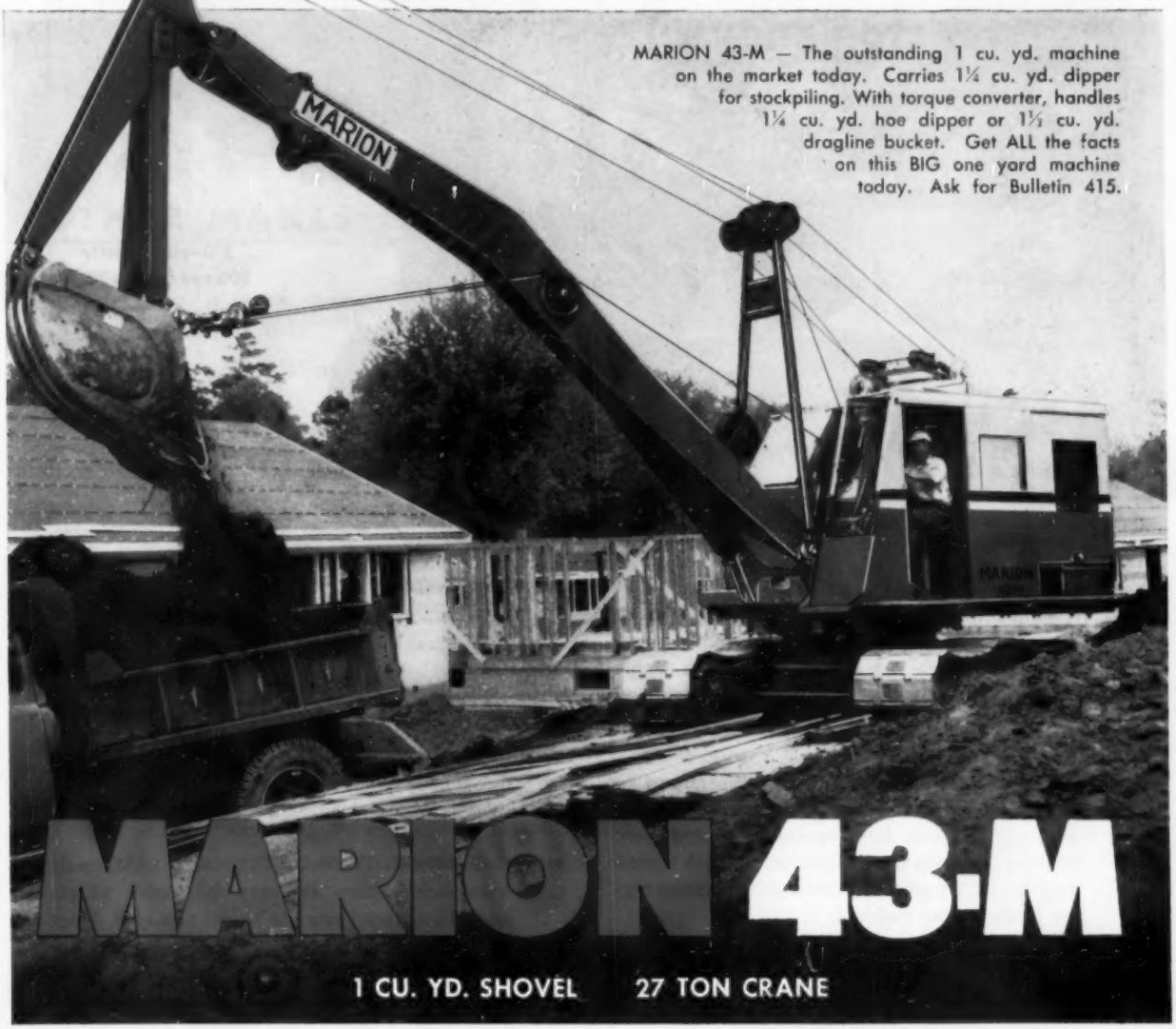
NAME .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

T NOW!



MARION 43-M — The outstanding 1 cu. yd. machine on the market today. Carries 1¼ cu. yd. dipper for stockpiling. With torque converter, handles 1¼ cu. yd. hoe dipper or 1½ cu. yd. dragline bucket. Get ALL the facts on this BIG one yard machine today. Ask for Bulletin 415.

MARION 43-M

1 CU. YD. SHOVEL 27 TON CRANE

MARION / MARION POWER SHOVEL COMPANY
MARION, OHIO, U. S. A.

POWER SHOVELS FROM ½ TO 60 CUBIC YARDS • DRAGLINES • CLAMSHELLS • LOG LOADERS
PILE DRIVERS • WALKING DRAGLINES • CRANES, CRAWLER & RUBBER MOUNTED • BACKHOES

. . . for more details circle 254, page 16

NEW OUTPUT ABILITY

with the ALLIS-CHALMERS HD-11G TRACTOR SHOVEL

2¼-yd capacity
105 net engine hp
32,000 lb
11-ft, 7-in. dump height

NEW POWER is provided by the modern, 105-hp Allis-Chalmers diesel. Tornado Turbulence and "follow-through" combustion mean cleaner burning and more power from fuel, as well as smoother engine performance and extra long engine life. Added power pays off in extra crowding and digging ability, fast work cycles.

NEW CAPACITY. Big 2¼-yd bucket is streamlined to roll in large loads more easily. Improved design cuts spillage, clean dumping saves time and effort shaking out loads. Optional 2¼-yd tip-back bucket rolls back 25 degrees at ground level, handles bigger loads of loose material.

NEW STABILITY. Extra-long track — with almost 9 ft of track on the ground — plus 8 truck wheels on each side and 32,000 lb of weight, give the HD-11G unusual stability, plenty of traction.

NEW-TYPE HYDRAULIC SYSTEM is simpler, safer, easier to maintain. Tank has fewer external fittings. Magnetic filters and suction-line screens protect entire system. Hydraulic pump offers fast action, long life.

NEW OPERATOR CONVENIENCE. The HD-11G features easily controlled, accurate bucket action; reduced lever pull with new-type clutch; full vision; roomy platform; foam rubber seat; 60-gal fuel tank.

NEW DEPENDABILITY AND SERVICING EASE result from such features as heavy-duty truck wheels and idlers; new, long-life track; new-type, long-lasting, ceramic master clutch lining; unit construction's quick disassembly and assembly of major parts; 1,000-hour lubrication intervals for roller bearing truck wheels, support rollers, idlers.

stop in soon and see the production-boosting HD-11G

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

Stop in soon and see the production-boosting HD-11G at your Allis-Chalmers dealer's.

ALLIS-CHALMERS

. . . for more details circle 179, page 16

HERE'S WHY MORE

Aeroil

Bottom Fired Melting Kettles

FOR RAPID, UNIFORM MELTING OF ASPHALT, TAR AND PITCH

ARE SOLD THAN ALL OTHER MAKES COMBINED!

twin economy

Save on initial cost . . . save on operating cost!

added efficiency

"Wrap-around" heat flow design instantly spreads 2000°F. heat for fast action, no wasted time.

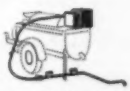
plus features

Choice of liquefied petroleum gas (bottle gas, butane, propane, etc.) or oil firing . . . choice of pneumatic tires, skids, hard rubber or spoked steel wheels . . . full selection of standard size models or units custom-built to bid specifications . . . important "engineered-in" design and construction advantages . . . *unconditional one year guarantee!*

WRITE FOR FULL INFORMATION!

Bottom-Fired Melting Kettles

Cut-Back and Emulsion Sprayers



Power and Hand Spray Attachments

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Tool-Master® Tool Trailers

PRODUCTS FOR ROOFING, CONSTRUCTION, ROAD MAINTENANCE AND INDUSTRY

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- Melting Kettles
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. . . for more details circle 178, page 16

Like these contractors, you can

Bid lower- Finish jobs faster- make more per contract

SPECIFY
GENERAL MOTORS DIESEL POWER

In all your construction equipment

"Works faster... burns less fuel... costs less to maintain."

That's what these contractors—operating *seven* different kinds of General Motors Diesel-powered equipment—report about their GM Diesels. They've got on-the-job proof that a GM 2-cycle Diesel does more work at less cost on every construction job.

If your business is building anything from sewers to skyscrapers, you'll find a good way to build your business is to *specify* a GM Diesel when you buy equipment.

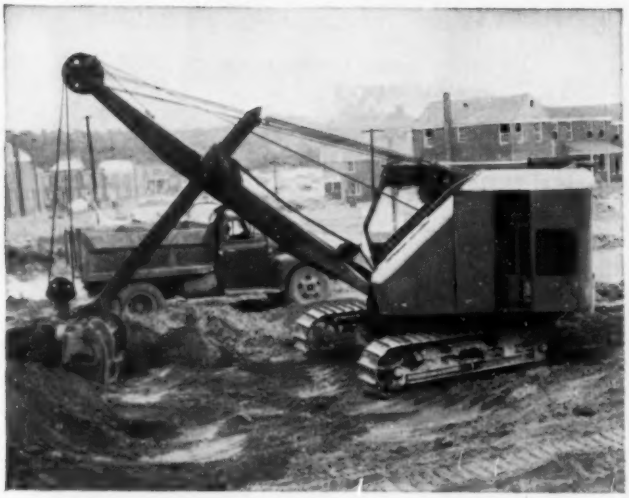
For this quick-acting 2-cycle Diesel accelerates faster under load, burns fewer gallons of low-cost fuel, stands up better even in toughest working conditions. You won't need service often but, when you do, your GM Diesel distributor backs up engine performance with fast service and quick delivery of low-cost parts, no matter where your contracts take you.

Today you can get GM Diesel power in over 750 different models of equipment built by more than 150 different manufacturers. Get their names from your local GM Diesel distributor or write direct for the list.

25% MORE WORK AT HALF THE FUEL COST

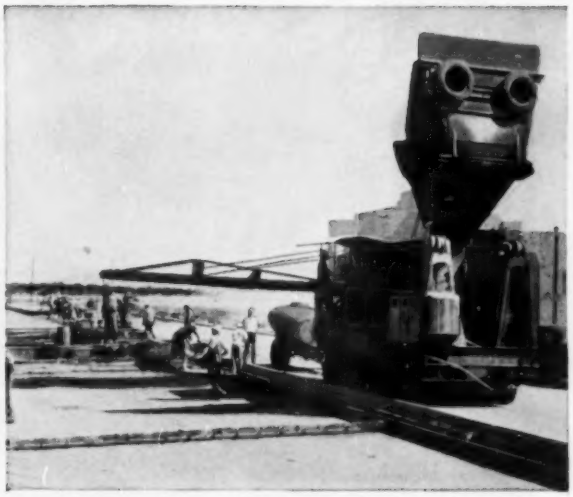
California contractors McGuire & Hester report they're getting 25% more work—and spending 50% less for fuel—since they converted this ¾-yard dragline from *gasoline to General Motors Diesel power*. The compact "4-71" GM Diesel did such a good job that the contractor repowered two more shovels with GM Diesel.

GM
GENERAL MOTORS
DIESEL POWER



WORKS ⅓ FASTER—CUT FUEL COSTS 60%

Maryland contractor Charles F. Knox, Jr., reports he gets ⅓ more production, has cut fuel costs 60%, since he converted this ¾-yard shovel from *gasoline to GM Diesel power*. The shovel works 8 to 10 hours a day, costs far less to maintain. You can specify GM Diesel power in over 50 shovel models built by more than 20 manufacturers.



PAVES 1400 FEET A DAY

This Koehring Paver, powered by a compact, quick-accelerating GM 2-cycle Diesel, lays 1400 feet of 25-foot wide pavement per day for the Austin Road Company of Dallas, Texas. You can lay pavement faster and at less cost with GM Diesel power—available as original equipment in 8 paver models made by 4 different manufacturers.

"FASTEST DITCHER IN THE AREA"

McGuire & Hester *specified* GM Diesel power in two new Buckeye Ditchers and a Lorain Crane, as well as repowering a Hough Payloader, after getting *more work at less cost* with GM Diesel power in their dragline. The master mechanic calls this GM Diesel-powered Buckeye Ditcher "fastest in the area."

NO REPAIRS IN TWO YEARS

These GM Diesel-powered LeTourneau-Westinghouse Tournapulls worked over two years in flying abrasive dust without losing a day for repairs, reports Arizona contractor Link L. Colvin. In every kind of earth-moving equipment GM Diesel power lasts longer, works faster, costs less to run and maintain.

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

New HOMELITE Pump

Whispers While It Works

Goodby residential complaints! Here's a new lightweight gasoline engine driven pump that takes it easy on the neighbors' ears. Yet handles any water problem . . . from seepage to volumn pumping! The new Homelite Model 36 S2 2″ self priming centrifugal Pump operates at slow speed with low noise level yet has high capacity of 9000 gallons per hour. It weighs only 85 pounds and can be easily carried by one man to the best pumping location. Starts quickly, primes automatically, gives long, dependable and trouble-free service under the toughest conditions. Ask your Homelite Representative for a free demonstration. You'll find a good neighbor policy in every pump.

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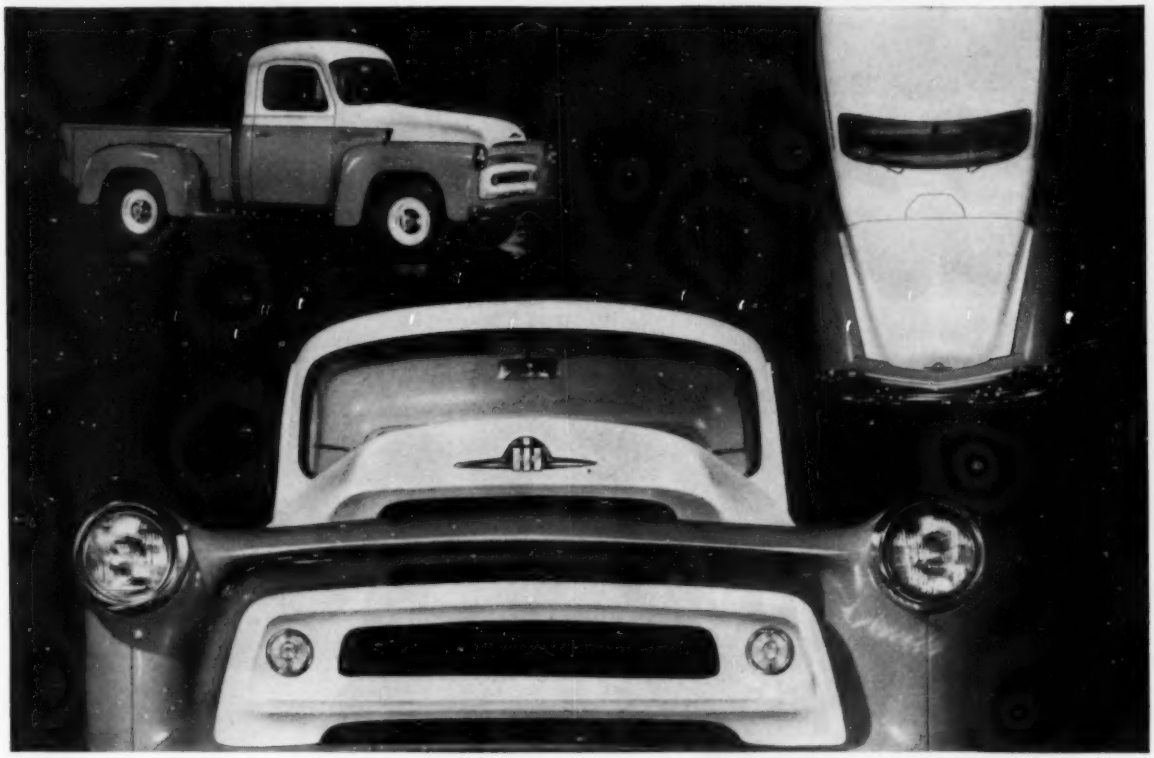
Canadian Distributors: Terry Machinery Co., Ltd., Toronto, Montreal, Vancouver, Ottawa

. . . for more details circle 212, page 16

new style! new comfort! new power!

new Internationals!



New **INTERNATIONAL "S-line"** includes light, medium and heavy-duty models from 4,200 to 33,000 lbs. GVW, with 10 gasoline and LPG engines, every modern truck feature.

Functionally styled for practical good looks!

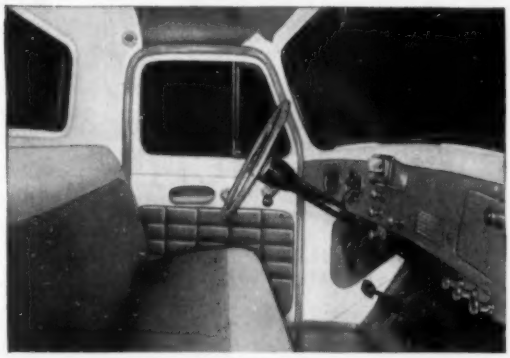
Here are the new INTERNATIONALS . . . a great new truck line from *any* point of view! Their clean-lined styling is trim and functional — designed to take the rough going of truck work without excessive repair costs.

Driver designed for real comfort!

They give you real comfort, too! They're driver-designed to let you work longer without fatigue. Loaded with performance and handling features that make hauling jobs easier.

More usable horsepower for BIG money savings!

These great INTERNATIONAL trucks offer more horsepower — develop their power for sustained operation at lower, more economical engine speeds. They're *all truck* with no passenger car engines or components asked to do a truck job. That saves you the BIG money — the over-the-years operating and maintenance money. Drive them today, at your INTERNATIONAL Dealer or Branch.



You relax in REAL comfort in Comfo-Vision cabs. Comfort-angled steering wheel. Low hood for closer view ahead. "Quiet-ride" roof lining, draft-free doors. Choice of 24 solid and optional two-tone exteriors. Optional deluxe cabs have color-keyed interior, chrome trim.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors . . . Motor Trucks Industrial Power . . . Refrigerators and Freezers

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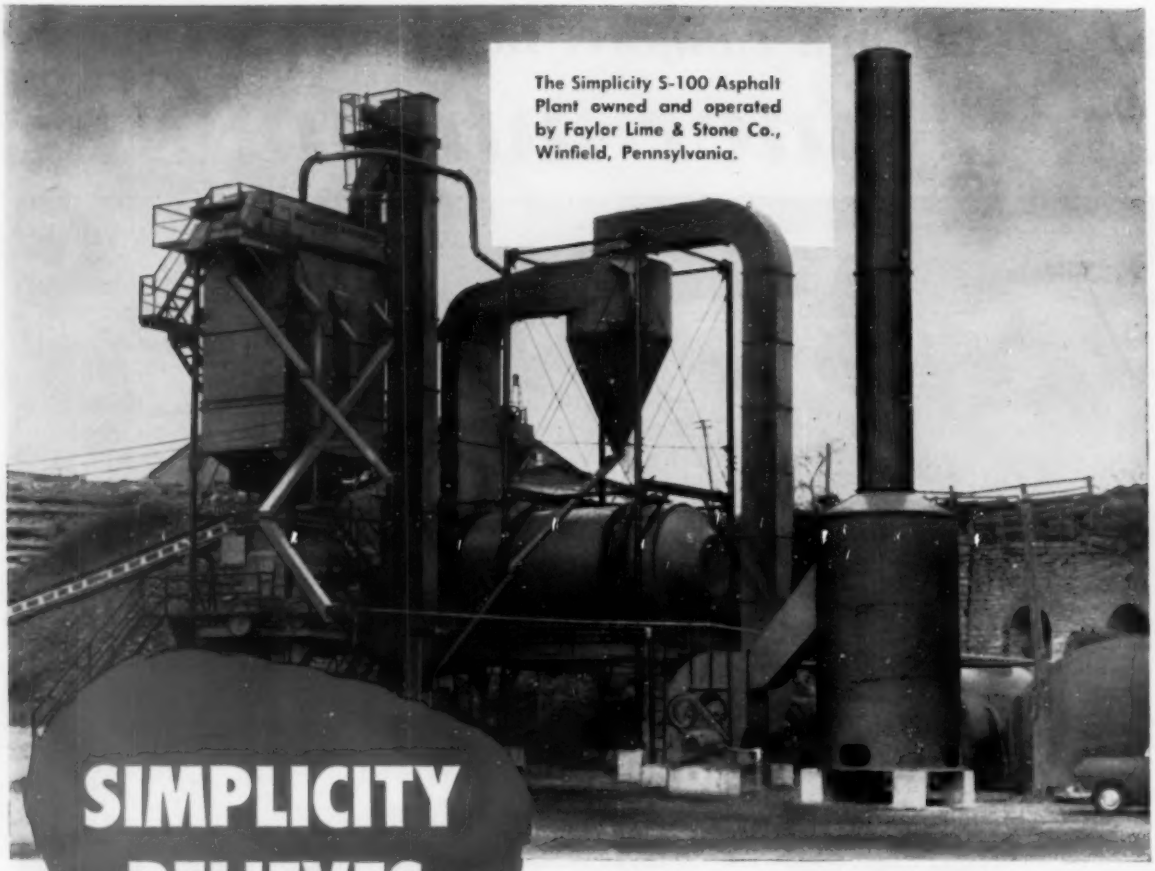


The Simplicity S-100 Asphalt Plant owned and operated by Faylor Lime & Stone Co., Winfield, Pennsylvania.

SIMPLICITY BELIEVES.....

1. That mixed asphalt by batch weight method is the best paving material, at any price, for streets, roads and air ports.
2. That asphalt plants are designed and improved by men experienced in the asphalt paving industry—plant owners, and operators.
3. That every asphalt plant should be fitted to the contractors particular requirements, by factory men with practical experience in plant design, manufacture, erection, operation and maintenance.
4. That the best sales policy is—"From Builder to Buyer—Between Men Who Know."
5. That the Simplicity asphalt plant is the most satisfactory and dependable means for producing more asphalt and better asphalt at the lowest possible cost per ton.

THE SIMPLICITY SYSTEM

FROM BUILDER TO BUYER
BETWEEN MEN WHO KNOW

THERE'S A SIMPLICITY PLANT NEAR YOU

On request, we'll be glad to send you the name and location of a nearby installation.

DEPENDABLE

THE SIMPLICITY SYSTEM COMPANY

RIVERSIDE DRIVE PHONE 2-2144 CHATTANOOGA 6, TENNESSEE

. . . for more details circle 234, page 16

● One of the new T-12 Euclid twin-engine tractors and an Allis-Chalmers HD-21 are seen pushloading in a typical "uphill" pit operation — that of S. J. Groves, where 1,000 scraper loads were hauled out in a 10-hour day.

UPHILL PUSH-LOADING SPEEDED THIS

Double-Quick Grading Job

No liquidated damages – just a "gentleman's agreement" – involved in rushing completion of approach fill for toll bridge over Wabash River in southern Illinois.

NO, IT ISN'T a toll road, but toll-road speed of construction prevailed in recent weeks on this unusual project. Its purpose is to provide a high-level approach across the Wabash River bottomlands to the new bridge being built by the Indiana Toll Bridge Authority near New Haven, Illinois. To finish the job on both sides of the river by December 1, the contractors have used an extraordinary array of equipment to make up for right of way delays.

The Indiana approach involving four miles of heavy grading will be covered in a later report. This review is confined to the Illinois side, where four contractors are building 5.4 miles of approach.

The principal contract, finally awarded June 29 after postponements, went to S. J. Groves & Sons Company, of Minneapolis, Minn., and J. C. O'Connor & Sons, Inc., of Fort Wayne, Ind., in joint venture. The $2,175,000 price covers placement of 6.3 miles of raised embankment averaging 25 ft. height and requiring 2,238,000 cu. yd. of borrow excavation, 10 large box culverts and 83,000 sq. yd. of 9″ x 22′ reinforced concrete pavement with granular base and stone shoulders.

The Groves-O'Connor combine brought in Potashnick Contracting Corp., of Cape Girardeau, Mo., as a subcontractor, the three companies each taking a grading section with separate equipment outfits but under

● Two of the contractors employed 50-ton rubber-tired compactors. This one is a Bros unit, working in the midst of placing and mixing operations on the fill.

central management. O'Connor will do the paving beginning October 1, 1955.

The fourth contractor on grading is Traylor Bros., of Evansville, Ind., which took 4,000 ft. of approach nearest the river in a $154,000 contract late in 1954. Traylor Bros. have 271,000 cu. yd. of borrow embankment including 20,000 cu. yd. of muck removal. This work is being done by Corum & Co., of Madisonville, Ky.

The Groves-O'Connor contract was signed without any delay penalty, following a promise made by the two contractors to the governors of Illinois and Indiana that the job would be graded and paved by December 1, 1955, despite the late start. After further right of way delays, a single outfit began work on July 13. By July 18, 25 scrapers and wagons were running in two outfits. On July 21 the third outfit arrived. On August 18, when these pictures were taken, 51 scrapers and bottom-dumps were in action and 16 more hauling units and additional pushers were due in. On this date Groves-O'Connor-Potashnick placed and rolled 42,000 cu. yd. of earth borrow in a 10-hour day. Barring a serious break in the excellent weather, the three companies expected to exceed 50,000 cu. yd. daily, completing most of the yardage in August and September, so that the paving work could start at the toll bridge and proceed westward.

Embankment Design. The Illinois approach consists of an embankment with pavement height 4 ft. above the great 1937 flood. Top width is 42 ft., slopes are 2 to 1, and fill heights vary from 20 to 35 ft., averaging about 25 ft. Since the fill is subject to partial inundation, large culvert openings are provided at one-half mile intervals for relieving flood flow.

The soils of the bottomland area, as indicated by extensive borings, consist of 8 to 10 ft. of heavy clay underlain by sand of varying gradation. The water table during normal dry-weather stream flow was about 10 ft. below the surface. From the soils studies it

● Euclid wagons plying to and from J. C. O'Connor's Euclid-loader-operated clay pit.

was determined that the embankment would be adequately supported without special design provisions.

Because of its location the embankment has to resist erosion and infiltration from flood waters. It was designed in accordance with Illinois standard specifications, which require placement in 6-in. loose layers and compacted by not less than 6 rollings with sheepsfoot or pneumatic-tired rollers to 90% of standard density (AASHO method of test No. T-99-49). Clay, sandy clay and sandy loam meeting fill requirements were plentifully available in convenient borrow areas.

To minimize slope erosion and infiltration, where borrow material is predominently sandy loam, the contractor was required to build the outer edges of each lift with clay. For the interior zone the contractor was required to mix the sandy soil and clay upper layers in the borrow pits by controlled loading, as will be described. In addition, the loose layers on the fill were mixed by discing prior to compaction.

The foundation area under the fill was cleared, disced and sheepsfoot rolled. Trees were sawed flush where fill depth exceeded 2 ft., otherwise grubbed out.

An important feature of the embankment design is the use of down drains along either side of the fill at 300 ft. intervals. Designed to handle surface run-off during the period of turf and vine development, the pipe will consist of about 10,000 lin. ft. of 12-in. corrugated metal pipe, asphalt coated and paved. The plan is to take this pipe up after two or three years for re-use elsewhere.

Borrow Pits. Unusual in Illinois road practice, the contractors purchased their own borrow pits, site approval by the engineers being required, however. Pits were required to be not less than 500 ft. away from the highway right-of-way line. Eight pits totaling 191 acres were purchased (see map).

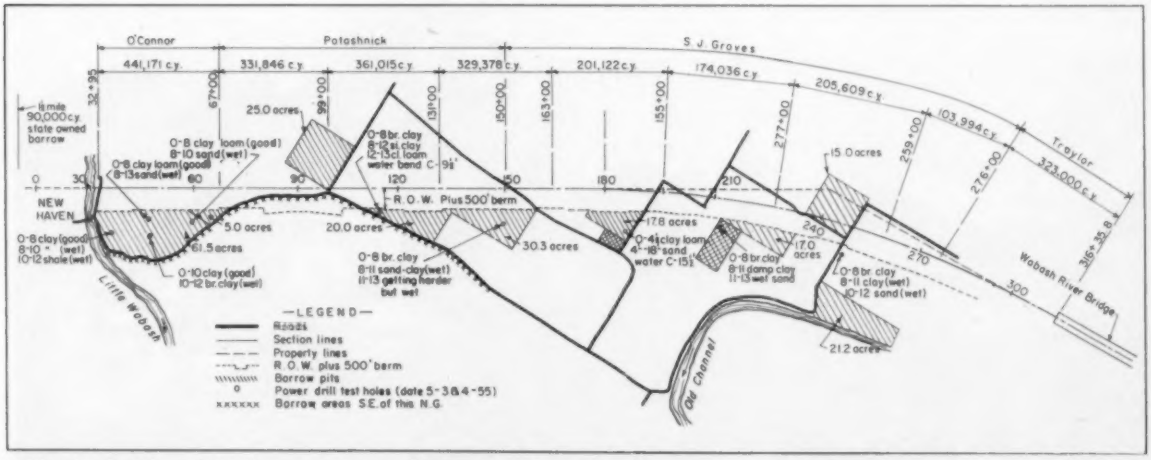
● Corum & Company's fleet included Allis-Chalmers scrapers, here working at scene of a muck-removal operation. Draglines will take over after good upper material is removed. Again note uphill loading, required to aid mixing of clay and sandy material.

O'Connor's Section. O'Connor took a 3,300-ft. section totaling 442,000 cu. yd. The entire yardage was obtained from a single large pit area lying along the edge of the bottomland. The west edge of the pit, underlain with shale rather than sand, was worked with a Euclid loader. The east side, underlain with sand, was worked with pushers and scrapers.

The combined O'Connor fleet as of August 18 included the loader, 12 Euclid bottom-dumps, 4 Euclid self-propelled scrapers and 4 Caterpillar DW-21 scrapers for hauling; 4 Cat D8 pushers (a D9 ordered), 3 D8 dozers, 2 Cat D8's pulling double-drum sheepsfoot units, 1 Euclid tractor with single-drum sheepsfoot, 1 Bros 50-ton rubber-tired compactor, 3 Cat 12 motor graders, and miscellaneous service rigs.

Potashnick Section. This 8,300-ft. section involving 854,000 cu. yd. was supplied from five pits, two of them quite wet and requiring dragline operation.

Potashnick's equipment included 2 Northwest 95 draglines with lightweight 3½-yd. buckets, 1 Northwest 25 dragline, 10 Euclid bottom-dumps, 8 Caterpillar DW21 scrapers, 5 Cat model 80 scrapers, 1 LeTourneau LP



● Showing location of the four contractor grading sections, in relationship to borrow pits and (in heavy lines) local roads affording access to the work. Note pit soils data, entered on plans to aid bidders.

scraper, 14 Cat D8's for dozer, pusher or clearing, 4 D7's, 1 Allis-Chalmers HD-20 pusher, 4 discs, 8 double-drum sheepsfoot units, 3 Cat 12 motor graders, 3 water wagons, and grease truck.

Groves Section. This 12,600-ft. section toward the river required 854,000 cu. yd. of embankment, supplied from four pits using push tractors and scrapers. As of August 18, 11 motorized scrapers were working two areas of a single pit, with 10 more hauling units due on the job.

The Groves' pit operation illustrates the problem encountered in most of the pits, which was to get the sandy loam into the center areas of the fill. The general procedure was to take out the upper clay layers over a starting point in the pit, then ramp down about 6 to 10 ft. into the sandy material found in the bottom of all borrow pits. One side of the working area was usually cut down until scrapers could be push-loaded on an uphill path, beginning in sand and ending in the overlying clay.

This procedure was varied constantly, until the operators found the most desirable combination of uphill loading grade, loading path length, etc., to secure the desired blend of materials and also minimize loading time. Much depended on the wetness of the pit and on the pusher equipment used. On August 18, Groves moved 1,000 15-yd. loads in 10 hours with an average round trip haul of 4,500 ft. (see photos). His loading time averaged 60 seconds throughout the day. The typical load path was about 200 ft. on 4% grade, giving a rise through 8 ft. of strata including 2 or 3 ft. of clay. These details varied constantly of course as new areas were opened up and worked. The scraper operator would start his load in the bottom or sandy layer and load through the middle and top strata of soils. Thus acceptable mixing was achieved by the time the material was dumped and disked.

The above-described 1,000-load day was accomplished routinely by 11 Euclid Model 155 scrapers with General Motors engined tractors, 3 D8 pushers, 1 Allis-Chalmers HD-21 pusher, and 1 Euclid T-12 twin-engine push tractor. The three D8's worked one section of the pit, the HD-21 and T-12 the other, with scrapers routed to keep a balanced operation. Two D8's with dozer cleared trees and brush, scalped turf, and cut and leveled haul paths.

On the adjacent fill, these 1,000 loads — or 1,500 cu. yd. of material per hour — were spread with two dozers disced and compacted with three D7 drawn double-drum sheepsfoot units with a Bros 50-ton compactor carrying 40-tons gross weight, also drawn by a D7.

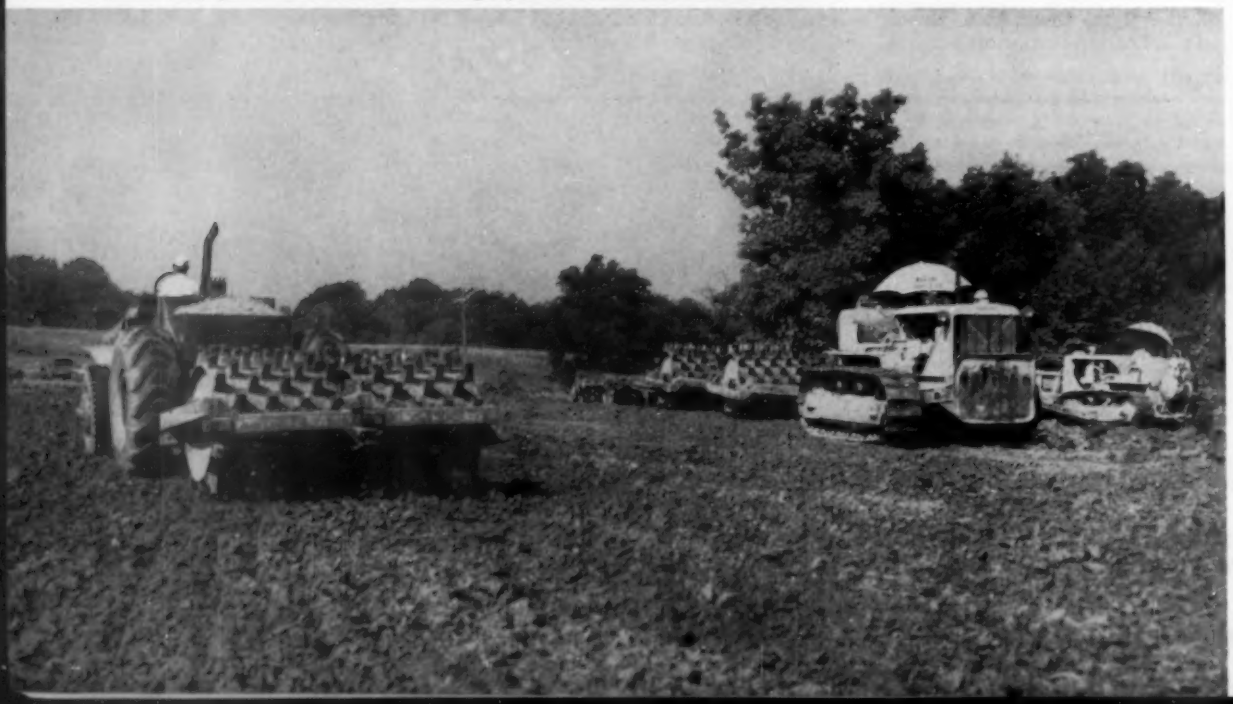
Corum Company. This company on its 271,000 cu. yd. of grading work near the bridge employed 4 Allis-Chalmers Model 360 scrapers, 2 Caterpillar DW21's, 3 D8 pushers, a Cat 12 motor grader and a Bucyrus-Erie 54-B dragline. Yardage has averaged 6,000 per day.

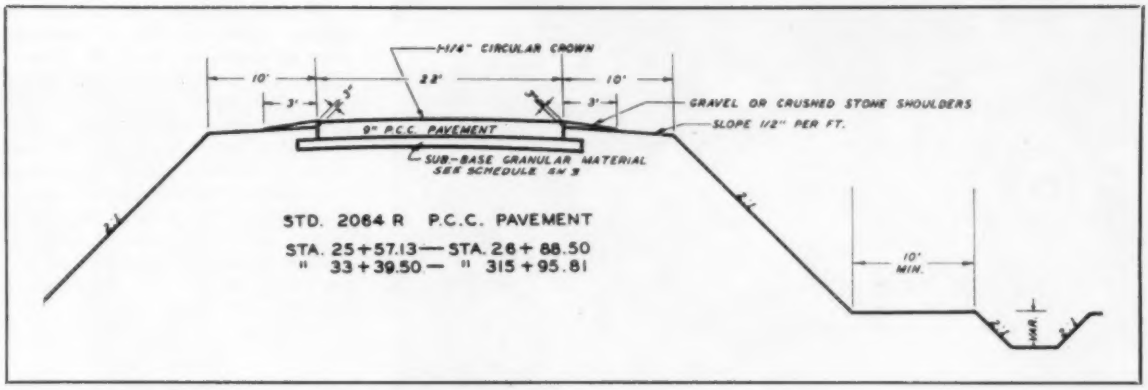
Engineers in the Illinois Division of Highways took advantage of this large embankment project to make a study of the efficiency and economy of the heavy rubber-tired compactor, as compared with the Illinois standard method requiring sheepsfoot rollers. Illinois roller specifications require that the sheepsfoot tamping units shall have a weight of not less than 100 psi of foot area, and 90 lb. per inch of width of drum. Not less than 6 nor more than 9 rollings are required. Pneumatic-tired units must weigh not less than 225 lb. per inch of tire tread. Specifications permit 125 cu. yd. per hour per roller.

The Soils Committee of the Division, comprising R. K. Andrews in the materials department, O. W. Terry, design, and S. E. Wiley, construction, issued a memorandum in July to the Effingham district, which has jurisdiction over the project. The purpose of the investigation as outlined, was to secure data on the operation of the compaction equipment and results obtained. Borrow pit soil used in the test section was a uniform A-7-8 (20) clay of probably more plastic than most soil used in embankments in Illinois. The data desired were to include (a) depth of compactive effort under the heavy roller, (b) number of passes over each layer necessary to produce final satisfactory compaction, and (c) number of cubic yards per hour of fill placement that can be compacted properly with one heavy compactor.

The heavy compactor was specified

● O'Connor used sheepsfoot rollers on this very heavy clay location, as part of the planned deployment of available equipment. Euclid tractor with single pair of drums used in the corners.





● Typical cross section on tangent for high-level roadway across Wabash River bottomland.

to have a gross weight which could be graduated up to 50 tons, and the data were to include tire size, pressure and contact area.

The investigation as recommended and subsequently conducted took in the central 30 ft. of width of a fill section 1,000 ft. long. Earth delivery was via a haul road entering it at mid-point, so that the haul paths for each 500 ft. end would be similar.

This zone was further divided into four 6-ft. vertical sections, as shown in the sketch. The sections were constructed as follows:

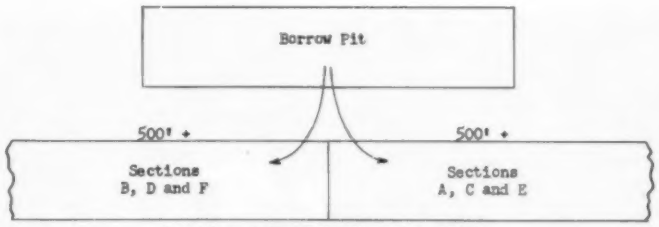
Sections B, D and F are control sections constructed in 4-in. compacted layers in accordance with standard Illinois methods, involving 4-in. compacted lifts and sheepsfoot rollers.

Section A was constructed in 6-in. compacted lifts, but rolled in a single round trip using a compactor having 25 tons gross weight and tire pressure of 75 psi. The round trip (two passes) was required over all surface area. Additional passes were required if found necessary to secure the specified 90% density.

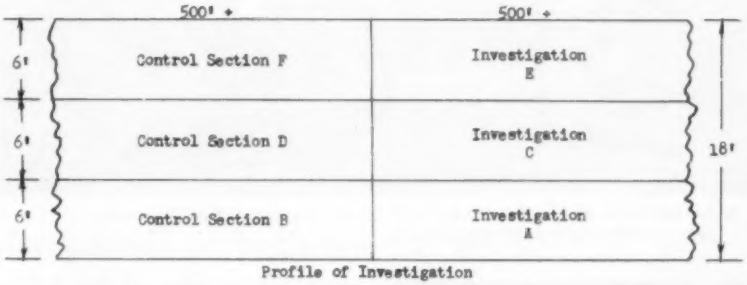
Section C was next constructed in 6-in. lifts with 35 tons on the compactor and 90 psi tire pressure, again with a single round trip specified unless more rolling was needed to secure satisfactory density.

Section E followed a similar procedure, with 6 in. lifts and 50 tons on the roller. Section G was similarly rolled in 9 in. lifts with 50-ton roller weight. Section H was then placed in 17 in. layers using the 50-ton roller weight.

Standard in-place density tests were run, four tests for each section, and Shelby tube samples were taken for laboratory study. While it is too early for a formal report of results, the engineers revealed that single round trip passes for the various roller weights on the 6-in. layers (plus com-



Location of Investigational Sections



Profile of Investigation

● Diagram of zones in a section of the fill established to investigate different methods of rolling. (See text for details.)

● One borrow pit was a dragline job — two Northwest 95's loading wet material on the Potashnick section.

● Engineering and contracting supervisory personnel playing horseshoe in the boarding house yard near the job. This daily lunch-and-rest hour was said to have definitely helped job relationships.

● Another look at Groves' Euclid push tractor loading a Euclid scraper; part of 1,000-load-per-day pit operation.

paction produced by the equipment) generally produced densities exceeding the required 90% for the various material involved. Some tests indicated results as high as 98 and 100% densities.

The approach road project here reviewed is being constructed by the Illinois Division of Highways, Ralph R. Bartelsmeyer, chief highway engineer. R. H. Major is district engineer at Effingham, H. K. Dolbow, district materials engineer, I. C. Bliss, district construction engineer, and Jack Frank, resident engineer.

R. B. Dexheimer representing J. C. O'Connor & Sons, Inc., is project manager for the joint venture, with W. C. Machin in charge for O'Connor, Cecil Seals for S. J. Groves and L. V. Spell for Potashnick.

● Taking soil sample on experimental fill, using a Shelby tube and drawing rig.

The ten multiple box culverts requiring 2,800 cu. yd. of concrete, were subcontracted to G. H. Allen of Vincennes, Ind. The over-all Illinois approach project also includes one additional prime contracts, for a girder bridge over the Little Wabash River, at the west end of the bottomland portion, awarded to Culberson Construction Co., of Pana, Ill.; and 1⅛ miles of additional approach involving shallow prairie-type grading and paving awarded to J. C. O'Connor & Sons, Inc.

The mechanism of soil adhesion

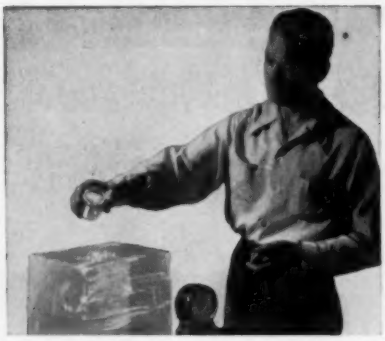
Tests on the adhesion between soils and solid surfaces were carried out under conditions such that failure took place at the foreign surface-to-soil interface. Equipment and methods are described.

It is concluded that: (1) The adhesion between the soils and foreign materials used is entirely due to the water film between the joined surfaces. (2) Within the sticky range, the value of the adhesion is equal to the product of the area of the water film joining the two surfaces and the tension within it. (3) Rate of loading seemed to affect the adhesive strength only in so far as it determined the length of time available for water to move into the film at the joint when a local increase in moisture tension occurred. (4) Solid-to-solid attraction plays an insignificant part in the adhesion.

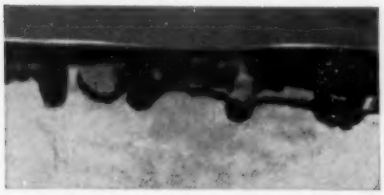
The nature of the foreign material is, therefore, of no consequence unless it is completely nonwetting or the soil exceptionally dry and coarse.

"Investigations into the Mechanism of Soil Adhesion" by E. R. Fountaine, Road Abstracts *(England) April, 1955. Review in* Highway Research Abstracts, *2101 Construction Ave., Washington 25, D.C., May, 1955.*

● Traffic on the 22-mile Eastgate section of the Ohio Turnpike, which opened December, 1954, has climbed steadily according to the Turnpike Commission. The millionth vehicle entered the toll gates on April 21, and the 2 millionth vehicle on July 22. Passenger cars have comprised 69.5 percent of the traffic, with tolls running about 50-50 passenger for cars and trucks. The entire 241-mile turnpike is expected to be open by the end of 1955.



Pellets of Peladow were placed on a cake of ice and their penetration rate was recorded.



The dark area in this enlarged photograph shows Peladow penetrating in only 45 *seconds* —illustrating its fast and effective action.

HAVE YOU TRIED PELADOW FOR FAST, LOW-COST ICE CONTROL?

Buckshot-size pellets of high-test (94-97%) Dow calcium chloride offer faster action, easier handling, greater economy in reducing ice hazard

Quick low-cost removal of ice is essential for today's heavily traveled roads. That's why Peladow® is so popular with highway engineers who must effectively remove dangerous ice—*fast.*

These buckshot-size pellets of concentrated (94-97%) Dow calcium chloride speedily penetrate the ice, generating heat which accelerates the melting action. Applied with a mechanical spreader at the rate of one to four ounces per square yard (depending on conditions), Peladow works like magic—even in sub-zero temperatures!

Another popular ice control method is the use of Peladow-treated abrasives. Stockpiles of coarse sand or cinders, treated with 50 to 100 pounds per cubic yard, stay freeze-proof, free flowing and easy to handle. This cuts loading and spreading costs.

The abrasives become embedded in the ice instantly—can't be swept away by wind and traffic—⅓ less abrasives are required. This sandpaper-like surface provides traction —helps protect lives and property.

For greatest economy, Peladow is shipped bulk in covered hopper cars, tank cars and trucks. Peladow, as well as conventional flake calcium chloride 77-80% (Dowflake®), is available in 100-pound moisture-proof bags. Contact Dow now for detailed shipping and handling information.

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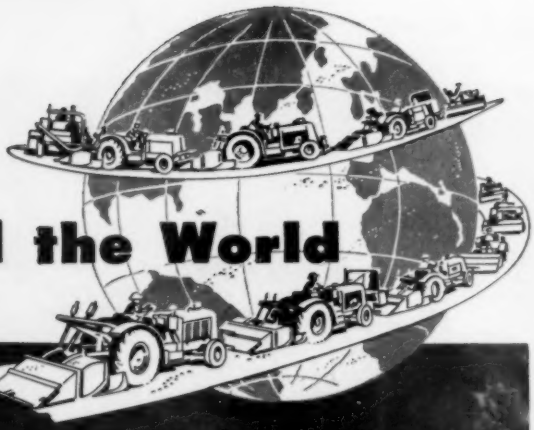
On YOUR Streets and Highways . . . And all Around the World



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Towns as small as 600 population — and of course cities with several millions of people, find the SEAMAN Mixer builds better bases for a lot less money. Townships with relatively few miles of road, counties and states with big highway programs depend upon the PULVI-MIXER as primary equipment.

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- The PULVI-MIXER mixes any suitable native material with any binder.
- It mixes in-place to cut material handling cost.
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- It provides higher densities, higher load-bearing values — and cuts maintenance to a fraction.
- And it operates at the lowest cost per square yard in *any* stabilized construction.

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HOW WOULD YOU DO IT?

One of a Series

1. Showing Keystone ¾-yd. pullshovel performing clean-up work on the Garden State Parkway widening project.

2. The machine is ready to move out, so trailer is backed alongside gravel ramp road, gravel piled up slightly to help make a path onto the platform as shown, and the excavator is on its way.

HOW to get a crane or shovel on a low-bed trailer in the field is an interesting problem at times. One contractor will use a timber ramp, another will do it differently. These pictures show the neat method employed by the crew of Villa Contracting Company of Westfield, N. J., in connection with the recent job of widening the Garden State Parkway (described in August and September ROADS AND STREETS).

The earth ramp was ready-built, for the purpose of taking traffic temporarily off the main roadway toward the ramp of an interchange.

All the operators had to do was to back the trailer to the position shown, make a few passes with the drag bucket to build up the gravel alongside, and then noodle the machine on board. The whole operation only took a minute or two.

3. With a fellow-worker calling the signals, the operator centers his machine on the trailer, throws on his brakes and the loading is done.

4. The Mack truck and Fruehauf trailer with its load is on its way to a different location where a job is awaiting the excavator.

Announcing

New Ford Trucks for '56

New capacities carry more load; new power moves it faster

Now! Most horsepower per dollar!

NEW POWER! More horsepower for your money than any other truck line—proved by comparisons of horsepower and suggested list prices of *all* trucks!

NEW CARRYING CAPACITY! New bigger payloads. New higher-capacity tubeless tires on every model.

NEW COMFORT AND SAFETY! New *Driverized* Cabs! New, exclusive *Lifeguard* Design safety features.

NEW STYLING! New "leadership look" from Pickups to 65,000-lb. GCW tandem-axle Big Jobs!

Ford's big advancements for '56 can make more money for you than ever. Choice of eight new engines with *Short Stroke design* (reduces piston travel, cuts friction) and up to 26% more power. New *Driverized* Cabs with full-wrap windshields to cut driving strain.

New *exclusive* Lifeguard steering wheel and Lifeguard door latches give added protection in case of accident. New styling builds prestige for your business. *Now on display at your Ford Dealer's.*

New Features for Sand and Gravel Trucks

● Here's a new *Money Maker*—the '56 Ford F-800 BIG JOB, shown above. Your choice of two mighty, Short Stroke engines: new 190-h.p. *Torque King* Y-8 . . . or new 200-h.p. *Torque King* Special Y-8 with performance-boosting hood air scoop, 4-barrel carburetion and dual exhausts for even greater time savings!

Both engines have such extra-long-life features as sodium-cooled exhaust valves *standard*. Also standard: new higher-capacity *tubeless* tires, tachometer, new 12-volt electrical system. Power Steering and *electric-shift* 2-speed axle available. New 24,000-lb. GVW; 48,000-lbs. GCW.

. . . for more details circle 201, page 16

EDITORIAL

Briefly Noted . . .

The recent failure of Congress to pass a road bill represented the first time in modern history that a major federal highway legislative effort came to naught. And the first time that such major highway legislation has become fouled up in partisan politics. In outlining recommendations for Congress, when it again takes up road matters after Christmas, Oregon state highway engineer R. H. Baldock told the recent WASHO delegation that politics should be laid aside and the needs of the traveling public be considered for a change. And he makes the sensible suggestion that the financing of the big new road program can best be done by stretching the job out to 12 or 15 years instead of trying to do it in ten. The main thing is to get it on a long-range continuity basis. Financing problems, he feels, will be solved easiest and with maximum face saving all around, by a combination of federal taxes and federal borrowings.

•

How far ahead to place orders for new equipment is one of the big questions faced by contractors right now. Some equipment items are currently piled up in distributors' yards, but others are in tight supply and are likely to have a waiting list of purchasers next spring, reminiscent of war days.

Even though most contractors cannot tell this early what their spring needs will be, it would seem a prudent idea to begin now to investigate the many new models that have come out recently, and to check on the availability of all key types of equipment. A good many contractors are placing orders now, specifying late-autumn, winter or spring delivery.

Some machines are likely to be available for late comers next spring only on a 3 to 6 months basis. At that time a week's delay may be serious for the fellow who has suddenly gotten himself a low bid. And with steel prices and other manufacturing costs going up, equipment bought next year is certain to cost five to ten percent more than present prices.

What makes early ordering even more important is the growing importance of having exactly the right units fleeted up for a particular job. As the recent articles in ROADS AND STREETS by Kenneth F. Park demonstrate, a machine that is exactly the right one for a certain set of conditions with respect to haul speed, yardage capacity and other factors, can be far more profitable than one that is almost the best unit, but not quite. The difference is often a big one, profit-wise.

•

A new approach in the use of liquidated damages is being taken by the California Division of Highways. Following a second look at the perfunctory rule of thumb practice of setting damages at say $100 per day, for failure of the contractor to complete work within the specified time, the engineers recently asked themselves, "Why $100? Why any one fixed sum? What for, anyway?" Upshot was a fresh analysis of the losses for which damages are supposed to compensate. These losses were divided between those likely to be entailed by the division of highways, due to overrun in engineering salaries and other costs, and losses by highway users due to tardiness in bringing the new, safer, more efficient highway facility into use.

Today the practice is to analyze benefits of on-time completion for each project. The result often is to set far higher rates, even as high as $1,000 to $2,000 per day for large projects. One project currently under study, which will involve the approaches to a strategic new multi-million-dollar bridge, is expected to entail damages of $7,000 a day or higher according to a spokesman for the California agency.

This development has brought queries by contractors, who often have been outraged at first but admit the fairness when the whole matter is explained. Some have advanced the idea of offering bonuses for completion before the time limit, and this possibility is also being looked into.

All of which is an example of what can be done to improve highway practice, and bring it into line with the times, by looking at old ways of doing through new spectacles. Have you seen your oculist lately?

•

The largest single employer of engineers in the United States is none other than our Uncle Sam, notes an article in "Mechanical Engineering." Something like 68,800 federal white collar workers are engineers, representing 8 percent of the federal government's employees and about 11 percent of the 633,000 engineers of the country.

This over-all nose count doesn't help us much in figuring out how to stretch available engineering talent in the road field.

The "guvment" has a relatively small part of the total highway engineers, considering the big stake it has in overseeing federal-aid work.

•

Another new tack being taken in the California Division of Highways is that of a new training program to recruit and step up the efficiency of subprofessional employees. Nearly half the construction department's 1,800 employees are so classified. While there presently are enough professional engineers to handle a 50 percent increase in construction volume, a serious bottleneck exists among the subprofessional groups. "If we can solve this shortage, we can handle double our present roadbuilding volume," said construction engineer Harris.

The training program being readied will include sound film strips on concrete methods, asphalt work, street construction and other subjects.

IT COSTS LESS TO BUILD GOOD ROADS THAN TO HAVE POOR ROADS

Roads and Streets in the News

Highway-User Tax Receipts Swelling Road Funds

Last month in these columns we recounted the instances of increase in the tax rate by the various state legislatures in 1955. Following is a similar recount however stressing the growth in funds being collected, due, in part, to the increased use of vehicles, as well as in their numbers.

Alabama: Gas tax receipts for July, $4,792,941 — up 26.4 percent over the previous July, due in part to new 1-cent gas tax increase.

Colorado: June gas tax collections up $90,000 over the same month last year.

Florida: Collected a record $80,658,900 in gas taxes during the fiscal year just ended — $7,000,000 up from the previous fiscal year. April, 1955 set a new monthly record.

Illinois: Gasoline tax is up 5 percent.

Kansas: Gas tax is down 2.48 percent, an exception to state trends.

Michigan: The new 1½-cent gas tax, effective June 1, yielded $3,426,000 during the first two months — available in a special highway construction fund for four-lane arterial trunklines. Regular 4½-cent gas tax collections, $9,211,000 — up nearly $500,000 for July over previous July. Vehicle license collections up similarly.

Minnesota: Gas taxes first six months $24,157,000 compared with $22,507,000, not counting refunds to farmers.

Montana: Fuel taxes brought $9,774,000 the first seven months, up $1,237,000.

North Carolina: Road fund receipts were $7,912,000 for July, up 9 percent, chiefly due to increase in gas tax.

Ohio: Net earnings from motor fuel taxes, after refunds totaled $52,404,000 during the first five months, up $3,150,000.

Tennessee: Due to new tax increases, collected $19,333,000 from motor vehicle registration, up 46 percent during the fiscal year just ended.

Virginia: Gas taxes first six months $32,328,000 compared with $29,823,000. June collections 9.5 percent over a year ago.

Milwaukee county expressways

Milwaukee County's proposed 38.5-mile expressway system will cost about $300,000,000, it was revealed by Henry B. Wildschut, county expressway engineer, in addressing a regional convention in Milwaukee of the American Society of Civil Engineers.

He said an earlier $221,000,000 estimate, made by the county's expressway consultants, did not include the cost of relocating public and private utility facilities and interest charges on bonds the county plans to issue to help finance the system.

Lansing parking bonds

A proposed $2,700,000 off-street parking bond issue will be submitted to the voters of Lansing, Mich., in November as the result of action taken by the City Council. The Lansing Parking Authority Commission has recommended that two ramp-type parking structures and two ground-level parking lots be financed with the bond money.

Urge expressway system for northern Delaware

A complete limited access expressway system for northern Delaware, tying in with the Delaware Memorial

● Seen here is one of the ten "Weathermaster" fog-fighting units installed along the northern reaches of the New Jersey Turnpike during the 1954 year. Each consists of a propeller driven by a 28-hp electric motor mounted high on a 30-ft. shaft. A conical deflector at the base of the shaft diffuses down-draft air over the surrounding area. The units are part of a research program by turnpike officials to increase winter driving safety.

Bridge and costing close to $120,000,000 for construction, has been recommended by the engineering firm of Howard, Needles, Tammen and Bergendoff.

The consultants in their report suggested that the expressways be financed through revenue bonds to be paid off from increased tolls on the bridge. No tolls would be charged for travelling on the expressways, which would be considered as "approaches" to the bridge.

The Delaware Legislature this year created a new Interstate Highway Division to administer finances and management of the Delaware Memorial Bridge and to issue revenue bonds for expressway highways, other roads and new river crossing.

Principal aim of the legislation was to provide for revenue bond financing of new express approaches to the bridge and thus free tax funds for other highway projects. The new division was expected to give early consideration to the engineering report, which was drawn up but not made public earlier this year.

Texas turnpike picture continues to boil

The Texas Turnpike Authority, a state agency, has vetoed a request by the private Texas Turnpike Co. for recognition of the latter's asserted preferential right to finance and build a toll road between the Dallas-Fort Worth area and Houston. Official recognition was needed to secure financing of this project, for which the private interests have invested considerable sums in public relations, engineering and contractor connections to date.

When the Authority was established by the Texas legislature in 1953, two private toll road corporations were given pre-emptive rights on routes through central Texas via Fort Worth-Dallas area to San Antonio, and south from the twin cities to Houston, with an 18-month option to begin construction. An informal opinion by Authority members cited the work done by the private company as being legally insufficient to make the project valid. In refusing to act formally one way or another to clarify the situation, and thus clear the way for toll road bond financing, the turnpike authority chairman, Armsted Rust, said that "it does not come within our province to sanction or not sanction the turnpike company."

H. B. Zachry Co., well known contracting firm of San Antonio, is one of three companies said to have contracts with the private toll firm for going ahead with construction, if and when.

Political Field Day for "Box Car" Roadbuilding Programs

Among the huge box-car figures being bandied about by political campaigners in discussing highway needs, the championship momentarily goes to Governor Stratton of Illinois. In a recent Chicago *Tribune* news story he predicts $700 to $800 million in highway work for the Chicago metropolitan area within the next four or five years.

Part of this sum would come from the Illinois toll road program, bonds for which are still expected to be sold this Autumn (as well as the huge bond program authorized for Cook County's urban expressways). Stratton cited the record $98 million spent for Illinois state road work in 1954, and the outlook for a still higher figure for 1955, but made no public mention of the heavy sums eliminated from the state's highway program by his legislative program which bowed to the trucking lobby and cutback the new truck taxes last year.

Georgia authority plans first rural road bonds

Chairman Roger Lawson of the Georgia Rural Roads Authority has announced that the agency probably would market its first bond issue in September to finance 235 projects in 126 counties at an estimated cost of $13,978,000. The authority was created by the 1955 Georgia Legislature with power to issue up to $100,000,000 worth of revenue bonds for rural road projects.

Two states legislate following floods

After the Massachusetts legislature authorized flood relief bond issues of $25,000,000 for highway and bridge repairs and $30,000,000 to restore water, sewage and other public facilities, the amount of a regular highway program bond issue measure was reduced from $150,000,000 to $125,000,000.

The regular highway bond issue bill, which had been resubmitted to the legislature by Governor Herter after having been earlier rejected, was amended by the State Senate and sent to the House in the $125,000,000 amount. Final legislative action on the bill was awaited at this writing, with approval regarded as likely.

As part of a flood relief program, the Pennsylvania legislature increased the state gasoline tax from 5 to 6 cents a gallon, to raise an estimated $54,000,000 in additional revenue during the two year period starting Sept. 13.

From the gas tax money, $45,000,000 was appropriated for repair of flood damaged roads, streets and bridges. Of this total, $15,000,000 will be allocated directly to local governments for street and bridge repairs, while the remainder will be spent by the State Highway Department.

The $9,000,000 excess from the gasoline tax hike will be returned to local communities for road and street construction and maintenance.

Seeks 'equitable distribution' of taxes for roads

Rep. George H. Fallon (D., Md.), whose bill for an expanded highway construction program was defeated in the last session of Congress, has requested the Bureau of Public Roads to compile data which will permit an "equitable distribution" of taxes to finance a roads plan.

In a letter to BPR Commissioner Charles D. Curtiss, the chairman of the House Public Works Subcommittee on Roads wrote:

"On the basis of available, or readily obtainable, data — and without prejudice to future findings — it is requested that the Bureau of Public Roads conduct such studies and compile such data as may be necessary to arrive at suggested conclusions and recommendations with respect to the equitable distribution of the tax load as between the various classes of vehicles."

Rep. Fallon requested the information by January 1. He also asked that any conclusions and recommendations not be made public until they are submitted to the subcommittee.

Heavy Rock Job Drilled With Jackhammers

● Work was kept on time throughout the Wyoming winter despite —25° temperatures, which forced drillers to bundle up in heavy clothing and required liquid gas injections to keep jackhammer cylinders from freezing. Drillers were timed in as little as 12 seconds for steel change-overs as they worked with graduated lengths up to 21 ft. for most powder holes.

SCHEDULED for completion in late September is a 3-mile highway grading job in Central Wyoming's Wind River Canyon on which the contractor (Inland Construction Company of Omaha, Nebraska) out-bid six competitors by electing to break 225,000 yards of rock with lightweight, one-man jackhammers exclusively.

This unusual choice of primary equipment (a more common choice would have been wagon drills) has paid off handsomely for Inland, according to an analysis by the jackhammer manufacturer. It enjoyed an approximately 50% lower investment in rock drilling equipment, since the 915 c.f.m. capacity of its two compressors would operate three wagon drills or 15 jackhammers. The contractor reportedly obtained five times more footage drilled with the hammers — Atlas Copco RH656-4W models — for only 2½ times greater direct labor operating cost.

The lightweight hammers enabled Inland to excavate one cu. yd. of hard-breaking diorite (rock formation also included red granite, Flathead sandstone and limestone) for each 1.15 ft. of drilling. Hammers were fitted with ⅞-in. hexagonal Sandvik Coromant drill steels, one-piece bit-and-rod "Swede" steel with tungsten carbide inserts. These lightweight steels, used in graduated lengths to 21 ft., also made possible an economical blasting cost due to their small bit diameters (1⅝ in. on starter steel, 1-5/16 in. on 21-ft. length).

Inland has kept the job on time despite severe operation conditions, such as Wyoming winter temperatures ranging down to minus 25 degrees, and contract restrictions that included thrice-daily road openings. During coldest periods equipment was kept in operation by injecting Tanner liquid gas into air lines to keep jackhammer cylinders from feezing, and by use of Zerex anti-freeze in other equipment.

Scene of the $529,875 project is US 20, a north-south lateral that feeds heavy tourist traffic to Yellowstone National Park. Three miles of the 11-mile long Wind River Canyon road, between Shoshoni and Thermopolis, is involved.

Inland Construction Co. project personnel includes A. B. Nuss, vice president and Western manager of the 55-year-old Nebraska firm; Murray D. McLaughlin, Wyoming Division manager, and Dan Ratliff, job superinten-

● Light-weight jackhammers were used by Inland Construction Company, on Wind River Canyon highway project in central Wyoming. Cuts such as this one ranged up to a maximum of 1,100 ft. long, 95 ft. deep and 60 ft. wide, many in hard-breaking diorite formation.

dent. Darrell Robertson is project engineer for the Wyoming State Highway Department. Copco Pacific assigned Ken Averill from its Denver field office to project service.

Ohio job starts biggest scrapers and tires

C. F. Replogle, contractor on the relocation of Ohio State Route 7, near the town of Stratton, began work in August with two Wooldridge Model OS-300 units of 34 yd. struck and 41 yd. heaped capacity each — the world's largest.

Carrying this load are four Goodyear Wide Base Earth Movers, low pressure tubeless tires — two of size 37.5-33 — likewise breaking size records. The scrapers were shipped bare from California, and the tires mounted at the job site under supervision of Goodyear engineers.

● Installing rubber ring behind rim lock ring of a 33.5-33 tubeless tire to make assembly air tight. There are three such seals for each tire.

Power for the big diggers is supplied by a pair of MRS #200 special tractors, giving each unit a normal 400 h.p. but it is noted that this can be stepped up to 600 h.p. by the addition of turbo-chargers, and to 800 h.p. by a super-charger. Tractor drive wheels have tubeless tires, size 29.5-29. Loads of 100,000 lb. can be moved by such an outfit.

The Goodyear Company calls attention to the fact that while it has made Wide Base Earth Movers for some time, this application marks the first tubeless, as well as the largest of all tires for earth moving equipment. The 37.5-33s weigh around 2,000 lb. each, and are now in regular production.

Movement on the Ohio job, located largely on river silt, is reported as substantially speeded by the extra flotation provided by low tire pressures.

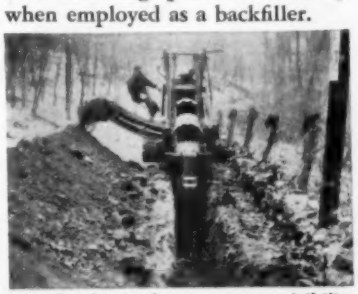
● Another 3 million barrels per year of cement production capacity is assured by announcement of Marquette Cement Manufacturing Company of Chicago, of a $16 million expansion program.

Cleveland "80" uses long reach, accuracy, teams up with trencher on tough 10-mile job

ON A 10-INCH CAST IRON JOB in Loogootee, Ind. this winter, the contractor matched his Cleveland trencher and Cleveland Model 80 side crane against 10 miles of really rough work. He reports his decision paid off well in both time and money saved.

Cutting the 10-mile line through hilly terrain alongside a curving road, his Cleveland "140" maintained a fast, dependable pace overcoming frost and plenty of Indiana sandstone. Despite the tough digging in close quarters, the "140" left a clean trench ready for pipelaying.

The one-man-operated "80" kept the pipelaying operation up close, usually only a couple of joints behind the trencher. It picked up the pipe strung along the opposite side of the road, turned on its maneuverable full crawlers and accurately positioned the pipe for fast, easy installation. The Model 80's large, easy-acting hydraulic clutches and smooth handling brakes and boom hoist which placed and held pipe exactly to required positions also are responsible for its outstanding speed and accuracy when employed as a backfiller.



Cleveland's perfect operator visibility and well placed foot and hand controls, clearly shown in these photos, keep operators at top efficiency for top production all day long.

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The solution was found in USF Structural-Plate Bridge Flooring which was rapidly welded in place and paved with asphaltic concrete. Material and labor were held to a minimum, and the least possible traffic delay was experienced.

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Meetings Ahead

GASOLINE PUMP MANUFACTURERS ASSOCIATION — General meeting, Seaview Country Club, Absecon, New Jersey; October 19-21.

AMERICAN CONCRETE INSTITUTE — Southeast regional meeting, Atlanta Biltmore Hotel, Atlanta, Ga.; Oct. 31-Nov. 1.

UNIVERSITY OF MINNESOTA — Second Annual Bituminous Conference, Minneapolis; November 2.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS — 41st Annual Convention, Jung Hotel, New Orleans, La.; December 4-9.

AMERICAN ROAD BUILDERS ASSOCIATION 54th annual convention and Highway Materials and Supplies exhibit, Municipal Auditorium, Miami Beach; January 11-14, 1956.

HIGHWAY RESEARCH BOARD — 35th Annual meeting, Washington, D. C.; January 16-20, 1956.

SOCIETY OF AMERICAN MILITARY ENGINEERS — Annual technical meeting, Palmer House, Chicago, Illinois; February 9-10, 1956.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA — Annual Convention, Waldorf-Astoria Hotel, New York, N. Y.; February 13-16, 1956.

Louisiana governor honors 29 department employees

Recently 29 veteran employees of the Louisiana Department of Highways were presented certificates and pins by Gov. Kennon at a special ceremony in honor of their long service. Service periods ranged from 25 to 35 years. In addition 304 others received certificates for service ranging from 5 years to 24 years. Presently 36 percent of all employees have served 5 years or longer according to Director George S. Covert. Key engineers and their top assistants have averaged 23 years. Longest in service is J. A. Kinkead, project control engineer, who received a special 35-year award.

• DR. D. B. STEINMAN, consulting engineer and bridge designer, has been awarded the International Grand Prize of Invention (Grand Prix International de l'Invention). This honor was conferred for his inventive and scientific contributions and achievements in the design and construction of major bridges.

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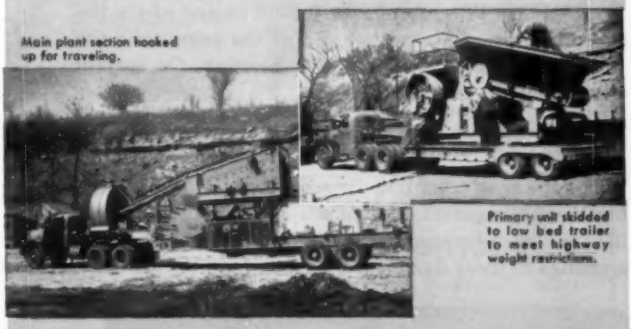
The primary jaw crusher, apron feeder with grizzly by-pass, operator's platform and structural supports are all mounted as a single unit on skids. This primary unit is bolted to the main truck frame. When highway weight limitations must be met, this unit may be quickly skidded to a low bed trailer and transported separately.



Main plant section hooked up for traveling.

Primary unit skidded to low bed trailer to meet highway weight restrictions.

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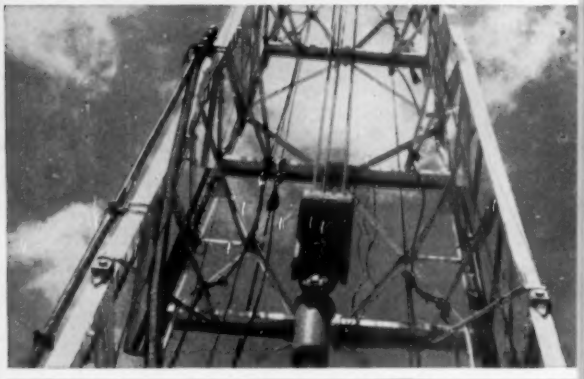

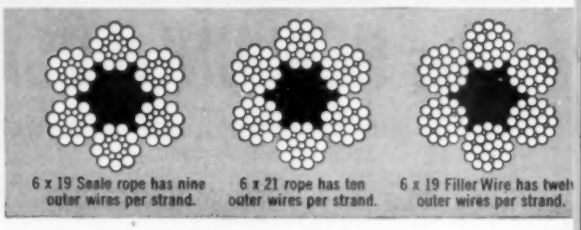
6 x 19 Seale rope has nine outer wires per strand.
6 x 21 rope has ten outer wires per strand.
6 x 19 Filler Wire has twelv outer wires per strand.

What can you do better with 6 x 21 *Red-Strand* wire rope?

What is 6 x 21 wire rope? It is sometimes called 6 x 16 Filler Wire. It is a construction of intermediate flexibility—between coarse 6 x 19 Seale and flexible 6 x 19 Filler Wire. 6 x 21 is a good choice where the operation includes abrasion and at the same time the rope is subjected to considerable bending. On certain types of duty the choice is vital to save time, effort and money.

When to use it? If, for example, your 6 x 19 Filler Wire rope is wearing out too soon because of abrasion, 6 x 21 with larger outer wires may provide much longer life. If severe bending is damaging your 6 x 19 Seale, a change to more flexible 6 x 21 may be profitable.

It is used on certain dragline jobs, vertical shaft hoists, drag and slackline scrapers, inclines, rotary and cable tool drilling rigs, and other equipment.

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"WASHO" Reviews Mounting Problems

New emphasis on functional and operational aspects of highway engineering urged by Acting President J. R. Bromley, in keynoting 34th annual meeting of the Western Association of State Highway Officials.

OUT at Jackson Lake Lodge, the new multi-million-dollar development in the shadows of Wyoming's towering Grand Tetons, there were many diversions. Moose could be seen through binoculars, and fishing was good. But the meeting halls were packed as a record 550 delegates listened to a sum-up of the problems of highway building. The delegates included representatives of the western state and territorial highway departments, Bureau of Public Roads, U. S. Forest Service, and National Park Service.

Being the first of the many regional and national highway meetings of the autumn and winter, the WASHO conference of September 9-10 was watched with special interest for tip-offs as to latest official attitudes, plans, and hopes for speeding up the big roadbuilding job.

Acting President J. R. Bromley, superintendent and chief engineer, Wyoming highway department, noted the continued slaughter of motorists. While engineers can make it harder for them to kill themselves, he said, through providing divided roadways, access control, improved sight distances and other physical means, "possibly we as highway engineers have under-publicized the safety and economic aspects of modern roads, and stressed — too much — the engineering and mechanical features." . . . "Could it be that we have emphasized the wrong approach?" He prophesied that within 20 years, with the certain continued growth of traffic, there would be more confusion and disaster on our highways than would result from a hydrogen bomb on New York City, unless something is done to correct highway deficiencies.

The WASHO delegation approved several important resolutions. Drawn up under the chairmanship of R. H. Baldock of Oregon, these, among other subjects —

- Backed in its entirety the president's proposed federal highway program, except that the method of financing was left open, and that the $101 billion job should be stretched over 15 years instead of 10, with appropriations on a 5-year active period basis to assure continuity of planning and construction.
- Urged that all state highway departments cooperate with the Highway Research Board in its forthcoming $150,000 study of highway laws.
- Requested that the Bureau of Public Roads not make any changes in Interstate Highway standards until the new federal program is adopted by Congress. (This at suggestion of Willey of Arizona.)

Latest AASHO Developments

Some of the new and continuing activities of the American Association of State Highway Officials were outlined by Jack Wiley, Assistant Executive Secretary of the national association, in his report, given for Executive Secretary A. E. Johnson. Mr. Wiley pointed to these developments as indicative of the organization's program:

- The drafting of tentative revised standards for the National Interstate System, to be submitted to members of AASHO for approval if Congress authorizes an expanded interstate construction program.
- The sponsoring of regional design seminars in the near future for highway department engineers desiring more knowledge in the urban expressway field. Some of the problems to be tackled are economics of location, right-of-way acquisition, functional interchange design, lighting, traffic control, maintenance and operation. The association believes that much of the work for which it is now considered necessary to retain consultants, could be assumed by department engineers with proper technical training.
- Appointment of Idaho state highway engineer Earle Miller, who is chairman of the AASHO Committee on Federal Surveys, to serve as AASHO consultant to the National Committee on Urban Transportation. The group is compiling data on urban needs.
- Study by an AASHO committee of proposed curbs on new additions to the U. S. Numbered Route System. Some highway departments, under continued pressure to add routes for commercial purposes, may be asked to adopt minimum standards which such routes must meet within five years. The committee is also considering the desirability of re-designating the entire U. S. Numbered System at the end of five years and is recommending a separate marking system for Interstate System routes.
- Advancement of a $150,000 study of highway laws. Five law graduates have recently been retained for ground

WASHO Officers for 1955-1956

President — J. R. Bromley, superintendent and chief engineer, Wyoming highway department.

Vice-President — D. C. Greer, state highway engineer of Texas.

Secretary-Treasurer — Herbert Glazer, secretary, Oregon state highway commission.

Executive Board — Earle V. Miller, Idaho; H. D. Mills, Nevada; and Wm. E. Willey, Arizona.

Contractor-Engineer Relations

It is becoming more and more important for contractors and engineers to work together as a team, reminded Wendell H. McNeal, district manager, Peter Kiewit Sons' Company, Idaho Falls, Idaho, in the Contractor-Engineer committee session of the WASHO meeting.

In this day of freeways, superhighways, difficult drainage and other problems, ways must be exploited to determine the causes of a good relationship on the job. The engineer must feel that the contractor is qualified and knows his business; and realize that the contractor risks his assets in the intangible costs and unforeseen hazards which accompany each project, and is therefore anxious to complete the job to specifications in the shortest possible time.

This speaker pointed to poor work planning and improper equipment as the No. 1 reason for contractor failure. Such conditions require the contractor to run his job on a "crisis basis."

From the engineer's viewpoint, said McNeal, we sometimes find an engineer who tries to run the entire job by designating the methods and equipment, sometimes even the workers who are to handle the different operations. In the discussion of this paper, the remark was made that, more often than realized, contractors "bid the engineer as well as the job," i.e., figure extra costs where difficult engineers are known in advance to be assigned to a project.

work under the Highway Research Board. Funds are being contributed by the Bureau of Public Roads, the Automotive Safety Foundation, and the state highway departments.

• Mr. Wiley told the Western highway officials that the association is not entertaining any compromise for a smaller federal-aid highway program. in spite of the recent defeat in Congress.

"Conversely, there must be a compromising between the two divergent philosophies of financing the proposed program," he declared. "Some group or someone is going to have to lead the way for Congress to look at the road program again as a non-partisan problem."

• A broad new attack on the technical manpower problem. At a joint meeting between Highway Research Board leaders and AASHO's executive committee, a committee of educators was appointed to study the subject and make recommendations. Committeemen are K. W. Woods of Purdue University (chairman), R. A. Moyer of University of California, and C. H. Scholer of Kansas State College. The committee will check ways to utilize colleges in speeding up the development of personnel of various classes from sub-professional to fullest professional requirements. The committee will also review time-saving procedures applicable in the highway departments.

Delegates at the WASHO meeting listened with interest to Mr. Wiley's outline of progress in launching the AASHO Road Test in Illinois. Only one state (which is legally prohibited) will not participate. Each highway department is asked by the Highway Research Board, which will direct the test, to name a representative to a regional advisory committee. After all states in each AASHO region have signed agreements with the Bureau of Public Roads and the Board, each AASHO regional vice-president will be responsible for having the 13 representatives of his region appoint an all-powerful 3-man advisory committee from their ranks, which will participate in active control over the project.

AASHO Test Road Status

The 12 members thus selected, plus the chairman of AASHO's Transport Committee and its Executive Secretary, will make up the highway representation on the 24-member advisory group. The balance will be outstanding technicians representing industry and allied groups.

Illinois has named a 9-man task force within its department to expedite the project. Over 900 soils tests have been made. Field surveys have been completed and right-of-way is being acquired and work pushed on plans and specifications.

Photogrammetry. Location and design of Forest Highways by Photogrammetric Methods, was the topic covered by Clair L. Arneson, U. S. Forest Service, Alexandria, Virginia. Noting that problems of locating and designing forest highways have become more difficult, due to increased inaccessibility and higher standards, this speaker said that the Service has extended the use of photogrammetry from topographic mapping to reconnaissance. The use of this tool is still in a fluid state, and no one procedure has been found adequate.

Soil-Cement. Utah's experience in placing over 400,000 sq. yd. of soil-cement was summarized by chief materials engineer D. F. Larson. This construction has been used on roads ranging from 900 to 16,000 vehicles per day.

Trends nationally were outlined by J. A. Leadabrand, manager, Soil-Cement Bureau, Portland Cement Association, Chicago. The first such road was placed 20 years ago, he observed; today over 10,000 miles of soil-cement is in service. Technology, well established, includes use of cement in small percentages for correcting subgrade characteristics as well as for regular soil-cement base and subbase construction.

Base Stabilization with Asphalt. In a notable paper, J. M. Lackey, special project engineer, The Asphalt Institute, Los Angeles, offered suggested methods for stabilizing various soils, and outlined progress in this field.

He said that in many areas of the country there are many varieties and vast quantities of granular and semi-plastic materials requiring only a low cost treatment, with asphalt, to provide excellent bases for high type pavements. He has divided soils to be stabilized into four major classifications, as an aid to the engineer in determining which of several procedures to follow. Of special interest is a detailed method of analysis and design for treatment of bases and subgrades, including an outline of the laboratory control required for good results.

Economics of Highway Planning. Oregon's yardstick for comparing potential road costs and benefits, and of making a choice of alternate routes to be constructed, were explained by W. C. Williams, deputy state highway engineer. Through the use of related reports, the individual cost and benefit items required for an adequate analysis of each road project can be estimated and combined as a "benefit quotent."

Mr. Williams observed that while yesterday's highway construction projects were frequently approved without sufficient approval of their eventual economic worth, modern transport "has progressed too far and become too large to permit such unscientific methods of development to continue."

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

. . . for more details circle 258, page 16

The Bridge

● This bridge, a 90-ft. structure across the Pocono a few miles north of Stroudsburg, is being demolished by contractor Charles Riebe, who built it in 1942. The timber stringers, used during the steel shortage, are being salvaged for use on temporary bridges nearby.

In five states late in August, flash floods ripped out bridges and highways and put upon highway officials and contractors the urgent responsibility for restoring these links so that rescue operations could proceed.

Space will not permit us to report how all agencies reacted to meet the disaster and to tackle the tremendous reconstruction job. But here is the story of how state highway men and contractors in one area — Pennsylvania's Monroe County — fought back during the hectic hours of the sudden storm and its aftermath. — Editors.

How the Pennsylvania Department of Highways mobilized contractors for emergency repairs following the devastating flood around Stroudsburg.

By Duane L. Cronk

THE weather forecast for Thursday, August 25, was "possible showers" in Monroe County, Pennsylvania. Hurricane Diane had apparently diminished, the weatherman said, into just another wet summer storm.

Twenty-four hours later, the eastern Pennsylvania county was experiencing a full-fledged flash flood, unlike any of the past. Twelve inches of rain had fallen — seven inches within three hours alone — and the rivers were raging — sweeping people to their death, tearing homes off their foundations and isolating thousands of survivors from food, safe water, shelter and hospital care. Highways were ravaged, and bridges on every main highway wrenched away or dangerously weakened.

It was the washed-out bridges — 36 on state routes alone — highway officials discovered later, that immediately became the focus of attention. Without them, transportation abruptly halted, rescue operations were stalled and reconstruction was impossible. Without the bridges, 10,000 children were trapped in summer camps in the Pocono Mountain area and hundreds of homeless, ill and injured could not be reached. All eyes turned to the highway department. Local reporters, grasping the situation, followed every move the roadbuilders made and posted their stories for front-page position.

For ten days, the highway men made news. The full story of their activities during the flood and immediately following the disaster would require pages to tell. Only the highlights are possible.

To understand the situation, one must look at a map of Monroe County. Three creeks, normally narrow streams, approach Stroudsburg from the north and west. The major highways cross and recross the creeks repeatedly. It is no wonder that all up and down their length, the roads were severed or that the bridges concentrated in the Stroudsburg area were demolished by the combined strength of the streams converging there.

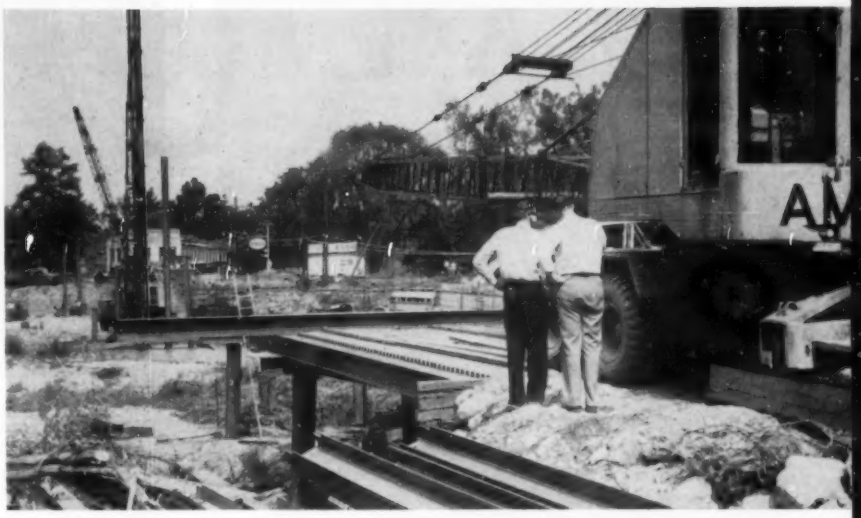
When the rain started on Thursday, highway department leaders, like everyone else, were not alarmed. It wasn't until nightfall that reports began coming in of swollen streams threatening vital bridges and then, suddenly, a wave of high water came down the mountain streams and the Pocono and the Brodhead rose 25 and 30 ft. At District Five headquarters in Allentown, 48 miles away, state engineers gathered in engineer A. L. Weisenberger's office and heard the dismaying news come in that one bridge after another had washed away. The only link they had with

● Bulldozers moved in here as soon as the water subsided. Note temporary water line, already strung along for local municipal supply.

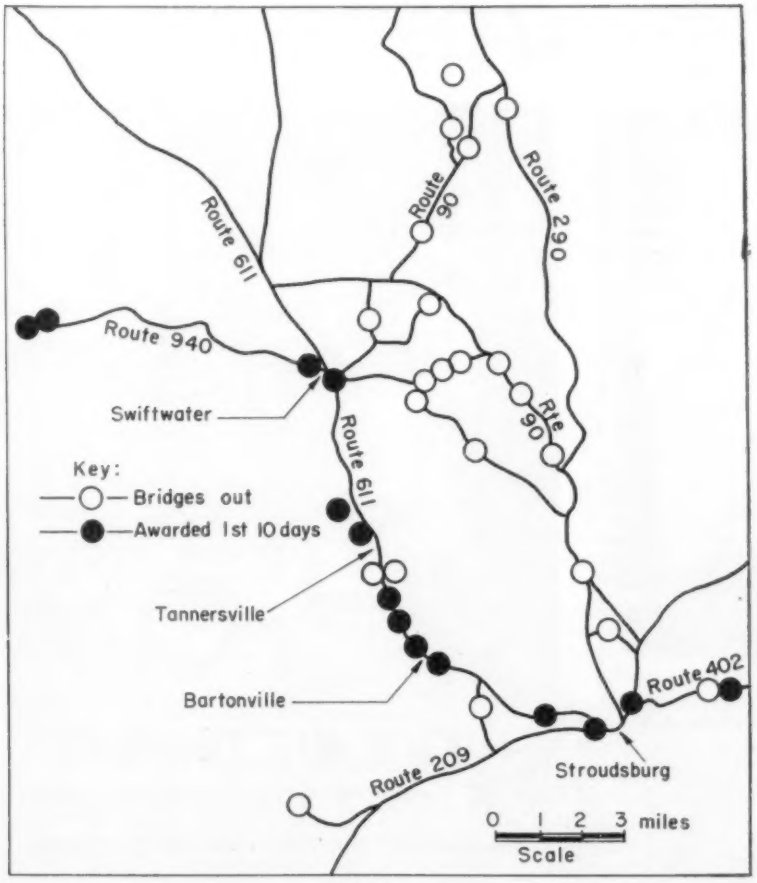
Crews Moved in Fast at Stroudsburg

the county was radiotelephone. From their own window, they could see Route 29 under water — the first time it had ever been flooded. In Monroe County, the rivers were not only tearing out the bridges but jumping their boundaries and cutting new channels across the fields to attack the highway in dozens of locations. In a matter of hours, the whole county was a pattern of islands, communication between them dead.

Then district headquarters lost contact with the maintenance men in Stroudsburg. All they really knew was that the rivers were running wild and that the devastation was mounting. It was some time before they were to see the twisted pavements and hear how men had waded and swam to their machines to try to keep the roads open.



● Heavy equipment was pulled off four routine highway jobs to rush construction of this 420-ft. bridge across the Brodhead in Stroudsburg. This is on the main route between Stroudsburg and East Stroudsburg, which was isolated for four days. Water crested at 30 ft. here and was 12 ft. deep where men stand now.



● Location of bridges washed out in area around Stroudsburg, Pa. and emergency restoration contracts (black circles) awarded within first 10 days after flood.

Friday was like a day in the dark. No one knew exactly just what had happened, or where, and nothing could be done except plan tentatively because of the high water. As the local press reported, "Never before had the department been so severely tried, so devastatingly seared, so effectively paralyzed."

Saturday morning, the rains stopped. District headquarters in Allentown had not had contact with the county for the last 20 hours. The men there, as in the field, had been without sleep since Wednesday night. The only way to check the damage, they decided, was to get to the scene of the disaster — driving, walking or wading. State Secretary of Highways, Joseph Lawler, came down from Harrisburg to joint the inspection party.

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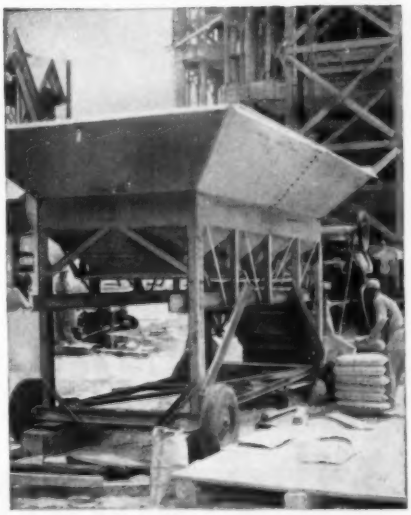

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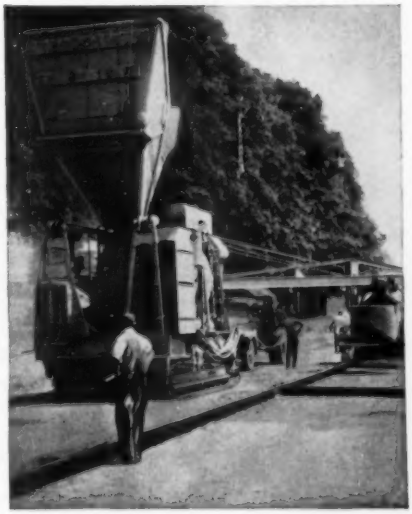

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DODGE
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. . . for more details circle 190, page 16

All that day they surveyed torn highways and broken bridges, or gaps in the highways where bridges had been. The score was discouraging — 36 bridges washed out, dozens weakened, numerous landslides, gullies 6 ft. wide and 10 ft. deep along roadways, concrete slabs buckled. Later, state engineers estimated that permanent replacements would cost about $6 million — that temporary structures and repairs would cost $2.6 million in the meantime. (Monroe County was only one stricken area. Total losses to all state highways in Pennsylvania will exceed $30 million.)

On Sunday, Pennsylvania's highway industry came into the picture. Equipment owners called to offer their machines. Highway contractors pulled their forces off other jobs and placed them at the disposal of the department.

"In our conference with these men," Secretary Lawler declared, "there was no discussion of money or terms of payment."

By-passing legal procedure, the department drew up and assigned 13 emergency contracts for temporary structures on key routes. Highway contractors whose men and equipment were closest to these spots were asked to move in without delay and told that plans for the temporary structures would be ready by the time they were organized. Under the negotiated contracts, the roadbuilders were to be paid at cost, plus 15% on labor and 10% on materials. Their equipment would be rented on the basis of the AED rental rates.

A procession of construction men began to file into the flooded area that day. For the next few days, the sight of heavy equipment on the roads was to become a familiar one.

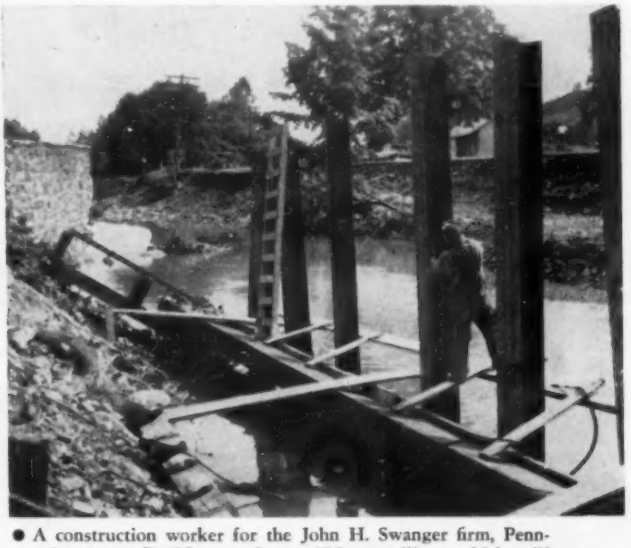
The first objective was to repair a three-span bridge across Brodhead Creek to reach isolated East Stroudsburg. One span had been twisted off. Engineers hastily filled the gap with earth and laid asphalt as an emergency measure. Two hundred buses stood by, waiting to evacuate children from the flooded resort area, and rescue crews were there ready to rush food and water into the stricken town. No sooner was the strategic earth fill finished than heavy rains washed it out and the job had to be done over again.

Finally, four days after the flood's height, contact was established and the highway men were heroes.

Ten days after the flood had crested, the work of reconstruction was well under way. Throughout the county, maintenance crews had cleared much of the debris away, had repaired miles of torn shoulders and damaged pavement. The Corps of Engineers had shipped in a Bailey Bridge

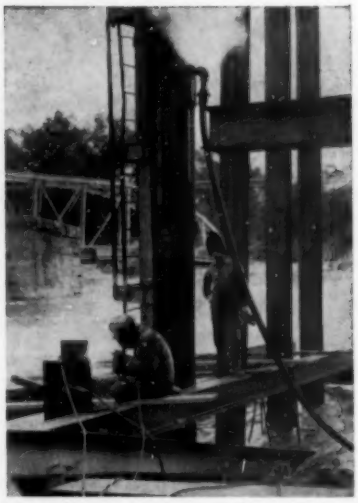
● Another view of washed-out bridge between Stroudsburg and East Stroudsburg. District engineer Arthur Weisenberger is pointing out the details to Pennsylvania Secretary of Highways Joseph Lawler and Assemblyman Van Yetter of Monroe County. Contractors G. A. and F. C. Wagman planned to get a temporary steel beam structure across here in 12 days, in spite of having to drive piles down 90 to 100 ft.

● All that is left of an 80-ft., two-span concrete beam bridge across the Pocono in Stroudsburg. J. Richard Nissley used dynamite to help demolish remains of this structure.



● A construction worker for the John H. Swanger firm, Pennsylvania roadbuilder, works on H-beam pilings which will support a new temporary structure to carry Pennsylvania Route 12 across the Pocono.

● Another view of the washed-out bridge on Route 12, where a new structure is being started a few feet away by the John H. Swanger firm. The Pennsylvania contractors are also handling demolition and clearance of collapsed structures.



● Welder works on one piling while another goes down beside him on new structure across the Brodhead between Stroudsburg and East Stroudsburg. Wrecked bridge in background.

● The Pocono washed out a bridge on this site on U.S. Route 611 near Swiftwater in a matter of minutes, observers said. It is being replaced, two lanes at a time by the J. Robert Bazley firm, following emergency placement of corrugated metal pipes.

from Toledo, Ohio, and erected it across the Pocono to open up another main route.

In Stroudsburg, where the Brodhead had lifted a 400-ft., two-span steel bridge off its piers and swept it downstream, the G. A. and F. C. Wagman Company, contractors, began driving piles for a temporary replacement, five days after the flood. The contractor ran into immediate difficulty. Expecting to go down only about 30 ft., he found they had to drive piles 90 and 110 ft. through the soft bed of the stream to get a 50-ton bearing load per pile. The temporary bridge — 420 ft. long with a 27-ft. roadway and 5-ft. sidewalk — will be of steel beam construction, consisting of 13 bents, with five 12-in. or 14-in. piles per bent. Less than a week after starting, by working from dawn to dusk, the men were welding flooring in place. The structure was open for traffic within 12 days after starting.

Some of the heavy equipment brought to this job included four cranes, including 30-ton American, a 20-ton P&H, a 25-ton Bay City; and 11 welding outfits. Fortunately, two-thirds of the steel was in stock and Bethlehem Steel Co. expedited shipment of the balance.

Contractors Moved Fast

The Pocono Creek begins only 12 miles north of Stroudsburg, but in that short distance it had knocked out 10 bridges, most of them on route U.S. 611. A quick tour of this stretch reveals what was accomplished in the first 10 days.

The J. Richard Nissley Co. was given the bridging of the Pocono in Stroudsburg. Here, the first problem was one of demolition. The old concrete bridge had dropped off its piers and the contractor had to use dynamite and pavement breakers to dislodge wreckage lying in about 3 ft. of water. A week after starting the job, the crew had cleared the channel, diverted the stream and started driving piles.

The new bridge, 80 ft. long and 25 ft. wide, will be the same design as the one across the Brodhead described above. The job was completed with the same speed. A 1½-yd. Northwest, a Caterpillar D8, two Lima cranes, and five compressors were put to work here for clearing and pile driving.

Upstream, the John H. Swanger firm from Lancaster, completed a temporary crossing of steel pilings, 13 wooden beams (12″x27″x50′), and 3-in. flooring. The beams were sal-

(Continued on page 102)

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Described—and Constructively Criticized:

Kansas' First Prestressed Bridge

By Henry Menkimeyer
Consulting Engineer and formerly County Engineer, County, Kansas

Following an outline of the features of this example of local pioneering of a prestressed secondary-road bridge, the author makes some rather blunt observations. Do you agree? Comments and discussion from readers experienced in prestressed small-bridge design and construction are invited. — EDITORS.

THE first prestressed bridge in the State of Kansas is now complete and except for some minor work will be accepted by the State Highway Commission and turned over to the County. The bridge, located 7 miles south and 3½ miles west of Lincoln, Kansas, is on a Federal Aid County Secondary Route and was built with Federal Aid Funds under supervision of the Kansas Highway Commission.

The bridge consists of three 45 ft. simple spans designed for H-15 single lane loading, each span prestressed. The abutments and piers are of the conventional H-piling and concrete construction. The bridge was originally designed for pretensioned beams; however, contractors could bid on any other method of prestressing and could change the size of the beam providing the loading carrying characteristics would conform to H-15 loading. The plans also called for the contractor to build one test beam and test it to failure. If this test was successful, he would proceed with the remainder of the beams.

The successful bidder, Paul Anderson of Holton, Kansas, based his bid on a beam designed by Prestressing, Inc., of San Antonio, Texas using post-tensioning method. The licensee for Prestressing, Inc., is the Midwest Prestressing, Inc., of Kansas City, Missouri.

Nineteen beams, each 16⅝ in. wide and in the shape of T with a depth of 22 in., were originally planned for each span. Each beam was specified to have twelve 5/16-in. Roebling uncoated strands at the bottom of the T and two of the same strands at the top of the T. Each strand was to be prestressed to an initial load of 10,500 lb. before concrete was poured. The final load per strand after losses was to be held to 8,400 lb.

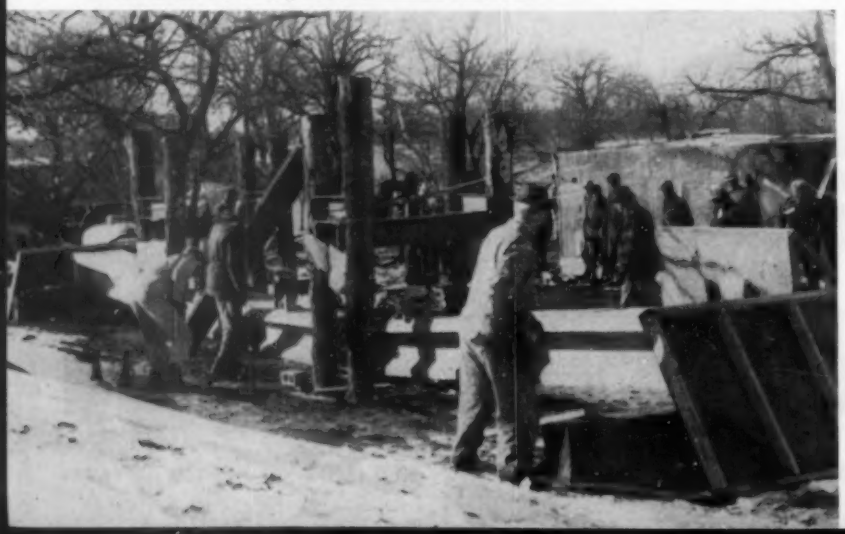
The beams as made by the contractor are still T-shaped, but heavier, being 31¼-in. across the top. The prestressing wires consisted of two units of 6 wires and two of 8 wires. The wires are ¼-in. cold-drawn, stress-relieved. The two 6-wire units were placed side by side near the bottom of the beam and the two 8-wire units were placed in the web one on top of the other. The lower wires were straight while the upper wires were in the shape of a catenary curve. The load per wire is 6,607 lb. The wires were threaded through holes made by 1⅜-in. flexible metal tubing and bonded to the beam by pressure grouting.

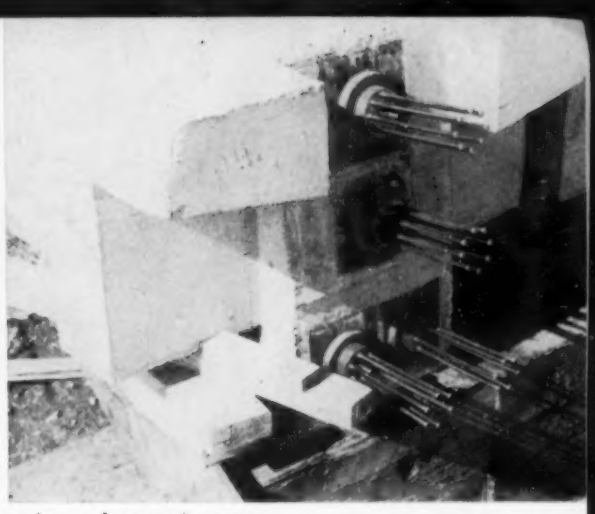
The test beam was supported at the ends by heavy timbers and the load applied to the third points. The method used by the contractor to apply the loads was to drive two piles on each side of the third points, then place a heavy steel beam across the test beam and support it on the piling to form a yoke against which the jacks could work while resting on the test beam. The jacks, each 60-ton capacity, were controlled by a single pump so that both jacks had the same load at all times.

A transit set up was made to record deflections at the center and the third points. The load was applied in increments of approximately 1300 lb. In the first test the maximum load reached was 25,000 lb. per jack for a total of 25 tons for the beam, with a maximum deflection of 4.88 in. at the center. The load was released and the deflection was .35 inches from the original zero deflection.

As this test exceeded expectations, no provisions were made to increase the load after the jacks reached their limit of travel; therefore it was neces-

● Test beam shown at point of maximum deflection.





● Another picture of the beam under test load and detail of end fittings, complete ready to receive grout.

sary to return at a later date, run the test again, this time resetting the jacks as needed. The maximum load reached during the second test was 32,000 lb. per jack or a total of 32 tons for the beam, with a maximum deflection of 20.11 in. at the center.

The beam did not completely rupture in failure but reached the point where it continued to deflect under a constant load. This was probably due to loss of bond and elongation of the wires along the entire beam. Examination of the wires after the test showed this to be the case.

The initial cracking showed up at a load of 16,000 lb. per jack and continued cracking between the third points. At the end of the first test when the load was released these cracks closed up to the point that they were not visible.

The prestressed beam was designed for a maximum load of 6,000 lb. at the third point. The load at the end of the first test was 4.17 times design live load. Design criteria by the Bureau of Public Roads calls for a cracking load to be at least equal to 1.0 D.L plus 2.00 L.L. and for the ultimate load to be not less than 2.25 (D.L. plus L.L.) or 1.0 D.L. plus 3.5 L.L. whichever is greater. The test shows that the cracking load was 8,000 lb. higher than required and 20,718 lb. more than required for the ultimate.

Ernest L. Fulton was resident engineer for the Kansas Highway Commission. Paul Anderson of Holton, Kansas, was the contractor, and Lyle Cushing, President of Midwest Prestressing, Inc., supervised and furnished all the material for prestressing the beams and the test. The writer was the consulting engineer and represented Lincoln County, the owner. George Epps is bridge engineer for the Secondary Roads Department of the Highway Commission. The Bureau of Public Roads was represented by R. J. Tipton. Test data were compiled and analyzed by R. L. Peyton with field work done by W. M. Stingley both with the highway commission.

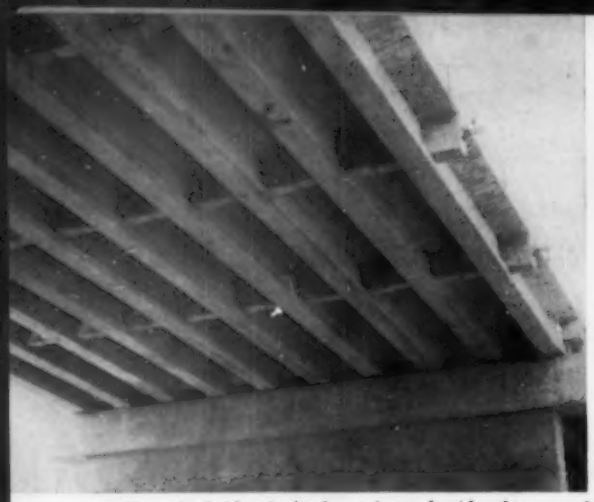
● A pair of cranes was used to set the beams one by one.

Author's Comments

Now that the bridge is complete and the writer has had an opportunity to view the entire process from the drawing board to the finished product, it seems in order to make a few comments. The contract price for this bridge was $30,228.55 which is high compared to other structures of equivalent carrying capacity. This is due to inexperience on the part of contractors and an added risk on their part. The method has merits which in time should make prestressing competitive in some localities, if it is not already so. Some changes in design will help. I believe we are permitting too great tolerances from precasting. This was shown by the inability to grout the transverse wires. The diaphragms did not meet true and square and therefore the grout leaked out before going through the first or second diaphragms. As a result of this it may be necessary to replace the transverse wires with galvanized cables should rusting occur.

The amount of camber resulting from prestressing should be investigated thoroughly. In this bridge the camber is excessive to the point of being noticeable as you drive over the bridge. In this case it could be eliminated by applying a hot mix surface.

One way to further simplify construction would be to follow the conventional steel beam, concrete deck method, but substituting prestressed beams for the steel beams. There are several ways this would help. The beam would not have to meet such exacting tolerances, for the deck would be poured in place as in steel-beam construction, using wire hangers to support the deck forms. The diaphragms could then be cast monolothic with the deck, thereby possibly



● How the bridge looks from the underside after completion of the lateral tensioning. Right — Showing hand rail in place and poured-in-place hub guard on the curb, along with the precast beams.

eliminating the need of transverse prestressing. This would also please the contractor because he would pour more field concrete and thereby help to reduce the unit cost of concrete. They could do their own casting and prestressing but from my own observation I believe better results are possible in a casting yard set up for such purposes.

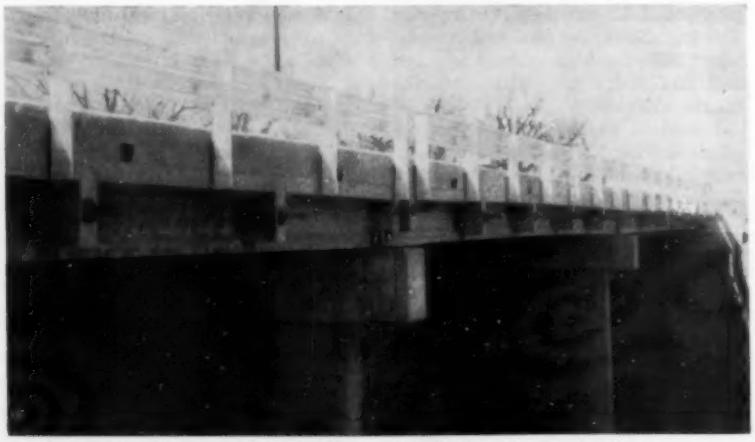
Along the same lines, more economy could be realized if the prestressed beams could be standardized in such a manner that a design engineer could call for a beam by number or similar designation.

The contractor would also be helped if the units are kept as light as possible. Most bridge contractors in this state have only one ¾-yd. drag-line or equivalent. The designer should keep this in mind. In this case it was necessary to bring two cranes to set the center span.

I am certainly going to continue boosting for prestressed structures. They are here to stay in more ways than one. But I feel that these points should be presented in the interest of all.

● The completed bridge — a 3-span structure representing a design which will have wide applicability, depending on costs and other factors as noted by the author.

● End fitting for transverse prestressing.



● Another view of the completed bridge showing the lateral tensioning bolts.

● 5,000-gal. tank drawn by Allis-Chalmers HD 15 tractor, spraying haul roads for grading equipment on Bero contract.

● Another 4,000-gal. tanker — a converted "Euc" with 4-in. Jaeger pump, used by Winkelman-Tompkins-Jones for spraying subgrade and haul roads, and for paver supply.

● Converted Super C Tournapull, carrying a 4,000-gal. water tank with 4-in. Jaeger pump for high-capacity spraying.

● "Hippo," the 5,000-gal. tanker with spray bar, another of Bero's over-size water wagons used in the soft sand at Plattsburg.

JUMBO WATER WAGONS

. . . seen at Plattsburg Air Force Base in up-state New York, where 3,500,-000 cu. yd. of grading and 550,000 cu. yd. of heavy portland cement concrete pavement are being completed for a Strategic Air Command Base. Herewith is a summary of some of the significant design details and unusual construction problems and methods.

Beginning 14-Page Report

• Two contractors have placed paving concrete this past summer at Plattsburg at a combined rate equal to 5 miles of 2-lane concrete road per day.

Bomber Base in a Sea of Sand

By Harold J. McKeever
Editor-in-Chief of ROADS AND STREETS

SAND makes an excellent runway foundation, but the new airfield being built on an ancient glacial lakebed at Plattsburg Air Force Base, New York, has entailed special problems for both the Corps of Engineers and the contractors.

The contractors took the grading in stride, but are having difficulties keeping their paving equipment mobile in the sandy going. Their improvisations, including batch truck towing methods and the largest array of jumbo off-road-type sprinklers and water haulers ever seen on an eastern project, are described and pictured in this report. This review also covers a special foundation problem for the heavy embankment involving clay underlain by silt, requiring sand drain type settlement procedures.

The $15 million airfield grading and paving job is part of a $60 million base construction project designed to house a 2-wing SAC operation. The airfield design was prepared by Seelye, Stevenson, Value & Knecht, of New York City, Architect-Engineers for the base, in cooperation with and under the supervision of the Corp of Engineers, in accordance with Air Force criteria.

Present contracts include a runway 300 x 11,760 ft.; a parallel taxiway 75 x 11,200 ft.; four cross-over taxiways each 75 x 1050 ft.; and a massive apron bordering on the main taxiway, 1080 x 8000 ft. All the foregoing are to be of concrete; the 1,000 ft. runway ends, taxiways and apron are 14 in. and the runway interior 13 in. in depth.

The taxiways will have 25-ft. shoulders consisting of a 6 in. gravel subbase, 6 in. stone macadam base and two 1½ in. asphaltic concrete courses.

The work was awarded in two contracts, the bulk in December of 1954, with some additions since:

1. Winkelman-Tompkins-Jones, a joint venture group, comprising D. W. Winkelman & Co., Inc., of Syracuse, N.Y.; Chas. H. Tompkins & Co., Inc., of Washington, D.C., and J. A. Jones Co., of Charlotte, N.C., has $11.5 million of the job including 2,700,000 cu. yd. of grading and 387,600 cu. yd. of concrete paving. Warm-up apron yardage subcontracted from the building contractors bring the company's paving to 405,000 cu. yd. Earthmoving was subcontracted to Dutcher Construction Corp., of Queenstown, Md.

2. Bero Construction Corporation, of Buffalo, N.Y., has the north end of the runway, apron and adjacent taxiways, and the calibration pad at the south end, their $3,600,000 contract presently including 800,000 cu. yd. of excavation, 165,000 cu. yd. of concrete, and related work.

Winkelman, et al., finished most of the grading and placed 55,000 cu. yd. of concrete in 1954. Bero made a later start, and both are scheduled to complete all paving this year.

Description of Soils

The airfield is on a glacial lakebed consisting in general of medium to fine sand with a trace of silt. Somewhat coarser material classified as coarse to fine sand with a trace of gravel was encountered at higher elevations in the middle of the runway and taxiway and on the west side of the apron. At the south end of the runway, sand and clayey-silt soils predominate. The thin topsoil has been removed only when it exceeds 4 in. depth.

Most of the runway, taxiway and apron area is in cut. The grading consisted chiefly of constructing a single large embankment area having a maximum height of 33 ft., base width of about 1,000 ft. and length some 3,000 ft. along the runway between stations 100 and 130.

Compaction requirements for fills follow Corps of Engineers standards, density of 90% being required under shoulders and 95% under pavement areas, as determined by the modified AASHO T-99-49 method of test. The upper 4 ft. of fills under pavement must be frost resistant material containing soil not to exceed 3% of particles smaller than .02 mm.

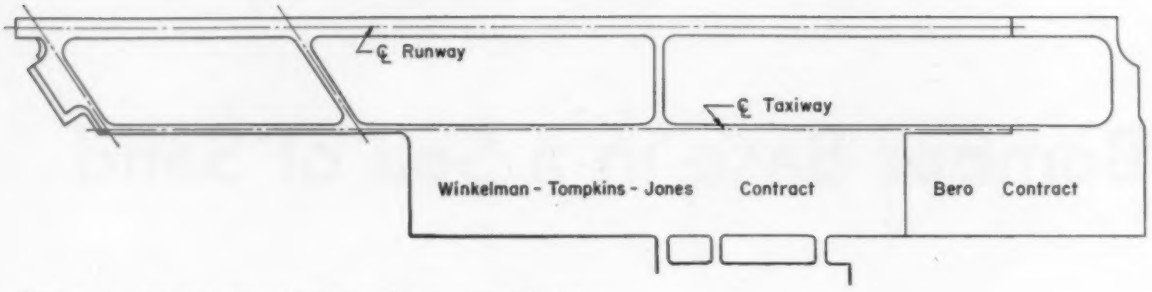
Cut areas are required to be densified to 95% to 2 ft. depth. Since this is a region of severe winters and deep frost, cut areas are also sampled for Hydrometer analysis to determine the percentage of minus .02 mm size. Some soils have required replacement.

Proctor values have run 105 to 115 lb./c.f at 8 to 10% moisture, with such typical values recorded as: 105.0 lb. at 8% moisture, 110.5 lb. at 9.5%, 115.3 lb. at 10.5%.

Because of the variations in grain size, moisture-density curves have been run for a large number of soils. From four to six density tests were run per two-shift day, and not less than one test for each 5,000 cu. yd. of fill. The tests were run with greater frequency at the beginning of the job, in order to help the inspection staff establish in mind, the appearance and other characteristics of soils when compacted in conformance with requirements.

Special Foundation Problem

The first major problem met in building the aforementioned large fill was to correct the unsuitable foundation conditions. The foundation soil of this area consisted of pre-consolidated, dessicated clay layer 8 to 10 ft. thick, underlain by saturated silt. The Corps of Engineers decided to install sand drains in the area, to accelerate consolidation in conjunction with a 3 ft. surcharge placed for a



● Figure 1 — General plan of current paving program at Plattsburg.

period of about nine months. Full-sized sand drains were considered, but as a compromise 6-in. holes were drilled with hand augers, and filled with a pervious sand, holes being 9 to 15 ft. deep and on 15 to 20 ft. centers.

Shelby 3-in. tubes were installed at intervals through the clay and 3′ x 3′ settlement plates were placed on the clay as a basis for checking pore pressure and settlement. The expectation was that the area would reach satisfactory stability during the 1954-5 winter and the present summer, in time for placing pavement in 1955.

After drilling the holes and filling them with sand, a 3-ft. blanket of free draining material was placed to aid in draining off the water from the sand drains. Specifications required this material to have a permeability coefficient of at least 500 x 10^{-4} cm/sec. Blanket material meeting requirements was found through exploratory borings made in cuts, in conjunction with the "Falling Head" permeability test on samples.

The Dutcher Construction Corp. filling operations started with the placement of the blanket on the sand drain area. Light rolling was done over this material. As the fill was built on up, rolling was done with four 50-ton compactors using progressively heavier ballast.

Three-Strip Grading

To simplify compaction control, the contractor was asked to perform filling of this area in three parallel strips. This permitted spreading to proceed full-speed on one strip, usually 800 to 1200 ft. long and 300 to 400 ft. wide, while rolling proceeded in the next, and in-place density tests were being taken on the third strip. The contractor moved his rollers to the next strip as each strip got an OK on density.

Filling was done in two 8-hour shifts using 15 Caterpillar DW21 tractors with 15-yd. scrapers, 7 Tournapull C's with 12-yd. scrapers, one Caterpillar D9 and 4 D8 push tractors, 4D8's and 4 Caterpillar 12 motor graders on spreading, and 4 Ferguson Model RT100-S 50-ton rubber-tired compactors drawn by D8's for rolling. Using this and related equipment, an average of 30,000 and a maximum of 40,000 cu. yd. of earth was moved per 16-hour day. The filling was largely completed between April and December, 1954. The Bero organization has used similar equipment and methods for its grading, nearing completion at this writing, which includes a widening of the big "problem" fill.

Specifications require 6 in. compacted layers, except that 12-in. layers are permitted when rolling with a 50-ton compactor having a tire pressure of 90 psi, if such rolling produces satisfactory compaction. Because of the difficulty of moving equipment in thick lifts of loose sand, the contractor elected to place material in 8 to 10 in. loose lifts, the compactors bringing the layers down to 6 to 9 in.

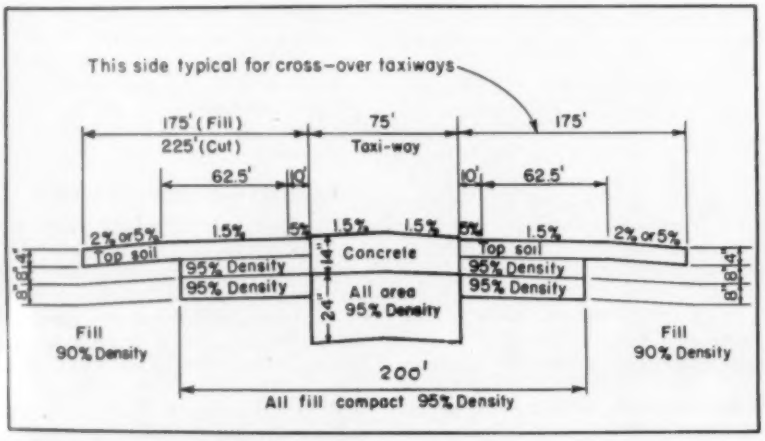
A minimum of three roller passes is specified. This effort plus compaction secured by the grading equipment has produced results that in some cases exceed specifications; densities have averaged 98% and 93% in pavement and shoulder areas respectively.

Water for compaction was applied with three 5,000-gal. water wagons, built by mounting the tank on a scraper or Tournacrane frame and fitting it with a husky 4-in. gasoline powered spray pump. Heavy tractors did the towing. In bringing the sand up from 3 to 5% moisture to the 8 or 10% optimum, approximately 15 gallons of water per cubic yard has been required. Thus an 8-hour shift production of 15,000 cu. yd. has required 225,000 gal. Water came from a large sump near the job.

Later, for wetting pavement subgrade, haul road sprinkling, etc., Winkelman-Tompkins-Jones used two 4,000-gal. tankers consisting of converted Euclid bottom-dumps. These highly mobile wagons loaded at a high-speed (one minute) filling station. Wagons were filled through a 10-in. gate and elephant trunk from a 5,000-gal. gravity tank supplied from the Plattsburg mains.

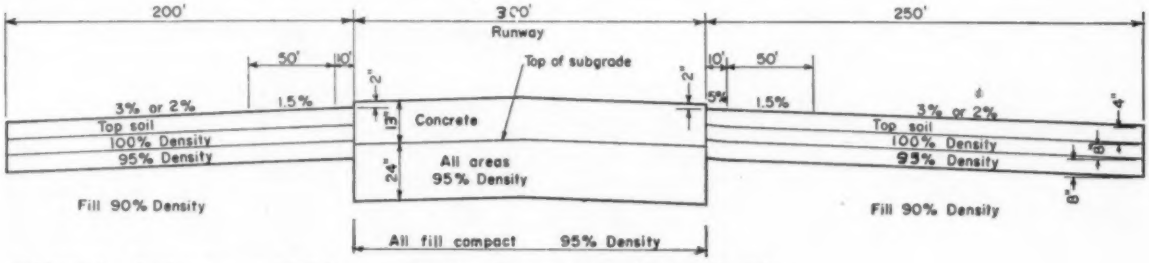
The water and rolling at Plattsburg were not separate pay items, but part of the excavation price. The cost of compaction to the contractor including moisture has been estimated at about 10 cents per cubic yard.

Paving work began in 1954 but was confined to cut areas only, under a specification requiring 6 to 9 months



● Figure 2 — Cross-section of taxiway.

● Bero's big Mack 5-batch trucks working on temporary carpet of sandy loam topsoil.



● Figure 4 — Section through 8,000 ft. runway interior. Pavement 14 in. for 1,000 ft. ends.

waiting period for consolidation where fills exceed 5 ft. depth.

Pavement is designed for a 100,000 lb. loading carried on dual wheels spaced 37½ in. and having 267 sq. in. tire contact area per wheel. The 14 in. thickness is based on a subgrade "k" modulus of 300 and flexural strength of 720 psi at 90 days.

Thickness is reduced to 13 in. for the runway interior in conformance with Corps of Engineers practice.

Beam-breaks have averaged 666 psi at 14 days and 777 psi at 90 days. Thickness is checked by taking cores every 500 ft. along each paving lane.

Prior to beginning the paving, load tests have been required to determine the subgrade "k" values for cut areas. Typical values reported are: 1250, 667, 714 and 500 lb./in.^{3}, all well over the 300 reading.

The concrete mix is based on a 30% sand/stone ratio, 6¾ bag cement factor, 4.5-5.0% air, and 1½ in. slump. Slump has been increased to 2 in. on hot days along with a paver slow-up to aid satisfactory finishing.

Sand and gravel aggregates are obtained from a riverbed area about 10 miles from the project, where crushing plants were set-up.

In addition to the problem of high ambient temperature, the engineers were concerned during the 1955 summer by the high temperature of cement as received in the cars. The contractors have obtained cement from five or six mills. Slag cement where used is kept separate from other Type 1 cement in the batching operation.

Concrete is placed in 20-ft. lanes in the runway apron, and in 25-ft. lanes in cross-overs and the taxiway. Contraction joints are spaced every 20 ft. No distributed reinforcement is used, and dowels are used only at work stoppage points or at special designated apron and taxiway areas.

Winkelman-Tompkins-Jones Paving Methods

Winkelman-Tompkins-Jones, working two shifts through the 1955 summer, placed from 3,500 to as high as 5,400 lin. ft. of 14 x 20 ft. lane per day (equivalent to a top of nearly 3½ miles a day of 8 x 24 ft. highway slab). With 1 min. 15 sec. mixing time a 50 cu. yd. per hour rate has been maintained per paver. Big production help is Winkelman's special floodlight outfits that "light up the

● Surcharge for widening the special fill area, as it appeared in July. Photograph eloquently shows the nature of the fine sand which plagued the contractors.

1 The 520-lb. form sections were lifted free by a D4 Caterpillar. Workers pulling form pins.

2 Forms were loaded for moving ahead, using an Austin-Western Hydraul-Crane and a Talbert dual-axle trailer drawn by a D6 Caterpillar.

3 Compressed air for driving form pins, supplied by an Ingersoll-Rand Gyro-Flo 210 compressor.

4 Chicago Pneumatic pin-driver in operation; 30-in. form pins were satisfactory in hard-packed sand.

Step-by-Step: Some of the Labor Saving

job like a ball park." Two such units each consist of a Schoolmaster 37½-kva diesel generator which supplies 20 1500-watt lamps mounted on a 30-ft. tower.

After trimming the grade with a motor grader, forms are set with 30-in. pins driven by a Chicago pin-driver from a mobile Ingersoll-Rand Gyro-Flo 210 compressor.

Subgrade was finished with a mechanical subgrader for a time, but this machine was taken off because it left a windrow of soft sand alongside the paving lane which slowed batch hauling. In late summer a Ferguson subgrader was being towed on the forms by a D6 tractor, and excess material sledded out at intervals with a Tournapull working through gaps in the forms.

Then the subgrade is given its final compaction with an International shoe-type vibrating tamper, and a scratch plane unit is towed in accordance with specifications to test the subgrade trueness.

5 Sand subgrade with slight excess of material between the forms was compacted with an International shoe-type vibrator.

6 Then followed a heavy screed towed by a tractor shovel. Excess material periodically sledded away with a LeTourneau scraper.

7 Final clean up of wetted sand subgrade, using two hand shovels and a long-handled float.

8 Push plates and towing cable, fastened as pictured, used on many Winkelman-Tompkins-Jones batch trucks, for assistance in soft sand when necessary.

9 How the pavement surface was protected against scratching by the crawler treads of the pavers — rubber strips were laid ahead, consisting of sections of old tire casings, and reloaded for redistribution with a rubber-tired dolly.

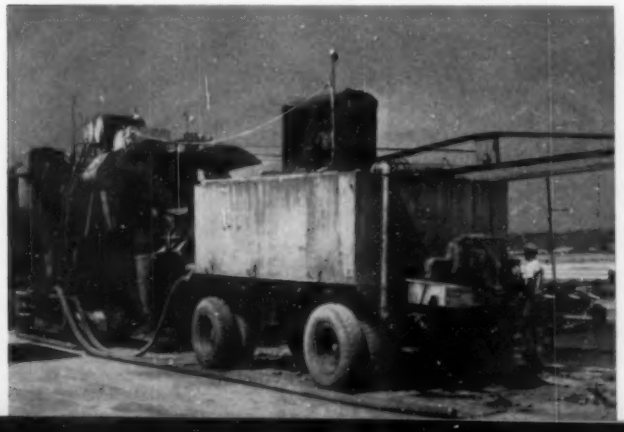
Methods Used by Winkelman-Tompkins-Jones

Concrete is mixed with two Koehring 34-E dual-drum pavers paired on one side, plus a Multifoote 34-E stationed ahead. Another Multifoote is held as a standby or used for odd areas. Behind the pavers are a Jaeger screw-type spreader; a vibrating machine consisting of 8 Vibro units powered by an Onan generator; two Jaeger-Lakewood transverse finishers each with two oscillating screeds; hand finishing with long-handled floats; a Koehring longitudinal float finisher; burlap drag bridge; and a Flexplane machine applying Servicized white-pigmented curing compound.

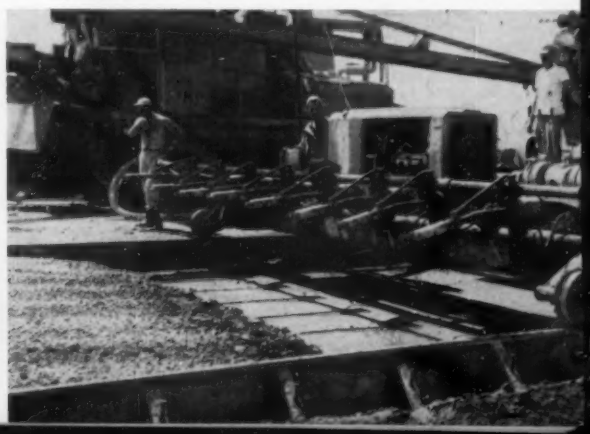
Duplicate finishing equipment is on hand to insure paving continuity during lane changes. A Lorain motor crane handles the resetting.

A total of 15,000 lin. ft. of Heltzel forms are on the job. Weighing 520 lb. each the sections are handled by an Austin-Western Hydraul-Crane, loading to a Talbert trailer towed by a D6. This contractor has two such outfits, which have proved very popu-

10 Even the tanks behind the pavers were usually dual-tired because of the sand often encountered. (1,000-gal. tank; 2-in. water pump feeds paver.)



11 Vibro vibrating units powered by an Onan generator were used on a bridge immediately behind the spreader.



Full traction while turning. This photo shows the Turbo-Dozer building up a load with the bowl tilted back in the "dig" position. As the weight of the load increases, it bears down on the cutting edge. If there's a tendency for the front wheels to rise, the operator "feathers" the hydraulic lift-control. This action transfers the weight onto the front wheels, pulls them down firmly on the ground without lifting the bowl. Note the rear wheel steering—full traction while turning.

Exclusive power-tilting bowl. The powerful double-acting tilt cylinder is visible in this photo. The operator controls the angle of the bowl from the cockpit; he can tilt the bowl back and forth 33 degrees between "dig" and "float" while travelling. Also visible is the hub of the Clark axle; final planetary reduction takes 70% of the torque load off the shafts.

Special bowl features. Two 1½ in. holes are bored in the Turbo-Dozer's bowl for fast mounting of pusher plate. Both ends of the bowl are fitted with vertical cutting edges which are interchangeable. End bits are also interchangeable, and can be reversed when the corners are worn. The C-frame is extra-heavy-duty, and a swinging drawbar is standard equipment.

Report on the MICHIGAN TURBO-DOZER:

New dozer features 27 mph speed, power-tilting bowl, rear-wheel steer

The new 2¾ yd. capacity Michigan Turbo-Dozer combines rubber-tired speed and mobility with outstanding traction and power. Its turbocharged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty of power for heavy dozing, push-loading and land clearing. And at 27 mph, it will run rings around any dozer on the market!

Power-tilting bowl. A powerful double-acting hydraulic cylinder tilts the bowl back and forth through a 33 degree arc. You can change the angle of the bowl from "dig" to "float" as you travel—work the cutting edge back and forth under stumps and boulders to uproot them. Two 6-inch lift cylinders give you tremendous lifting power and down-pressure—you can raise the cutting edge from 24¼ inches below ground level to 43¾ inches above.

High flotation tires, oscillating axle. Big 18.00-25 low pressure tires (nearly 7-foot tread) give the Turbo-Dozer excellent ground contact in dry, wet or sandy footing. You can cross railroad tracks or travel along the ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-drive axle oscillates to keep both rear wheels in firm contact with the ground. With 14½ inches of ground clearance underneath, it's practically impossible to get "hung up".

Full traction while turning. The Turbo-Dozer gives you full tractive effort even in a turn. *All four wheels are always driving,* except when you declutch the rear axle for highway travel. Rear-wheel steering eliminates unnecessary tire wear—you don't brake or drag your inside wheels on a turn.

On land clearing, you can doze a load downhill, turn it into a tight spot—and still have full power to pull yourself out with your wheels cramped the way you went in. If one wheel begins to slip, a locking differential automatically applies power to the wheel with the firmest footing. Power steering is standard—you can steer with one hand!

Power-shifting, 300% torque multiplication. Clark's exclusive power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two fingertip levers on the steering column, the operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

The 3-to-1 Clark torque converter gives you a steady power flow, regardless of speed. As the load gets heavier, the torque output automatically increases up to 300% at stall speed—gives you the extra torque to plow through the toughest spots. You can't stall the engine, and there's no clutch to slip.

Top speed 27 mph. The new Turbo-Dozer is 50% faster than any other rubber-tired dozer, four times faster than the average crawler. It dozes faster and travels faster, which means it will give you faster cycles going and coming. You can economically send the Turbo-Dozer on its own power to handle jobs many miles away, and you can cover more ground on any given job. But speed isn't the whole story. Once the Turbo-Dozer arrives at the site and starts to work, *it's got the muscle to do the job!*

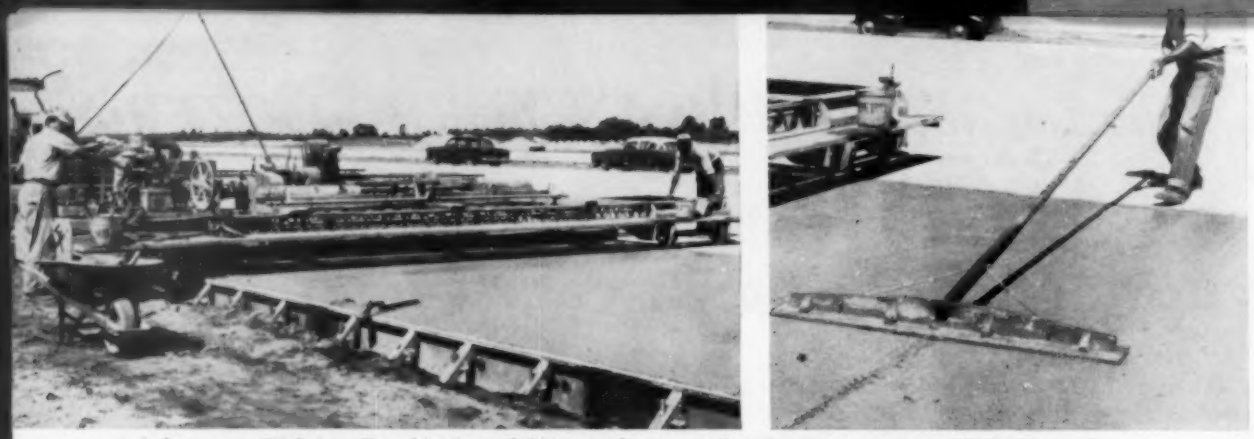
Prove it for yourself. The new Michigan Turbo-Dozer gives you faster cycles and more yardage in every shift—more dollars of profit every day. Ask your local Michigan distributor to prove it, with an on-the-job demonstration; or write direct for detailed specifications. The Turbo-Dozer is available on the low-cost Michigan Lease Plan: no down payment, pay as it produces!

Powerful "pry-out" action. To uproot stumps and boulders, you hook the cutting edge underneath and work the bowl back and forth. As this happens, the hydraulic system automatically diverts some of the engine power from the wheels to the bowl action. In effect, you transfer just enough power to eliminate wheel spin, yet you still maintain a strong crowding action as you pry the obstacle out.

MICHIGAN is a trade-mark of Clark Equipment Co.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division, 394 Second Street
Benton Harbor 35, Michigan



● A feature on Winkelman-Tompkins-Jones finishing work was use of a Vibro-Tamper unit recently developed in Texas. Purpose: to press surface aggregate away at location of saw-cut. The slight depression thus made is mortar-filled (right) prior to passage of the longitudinal finisher.

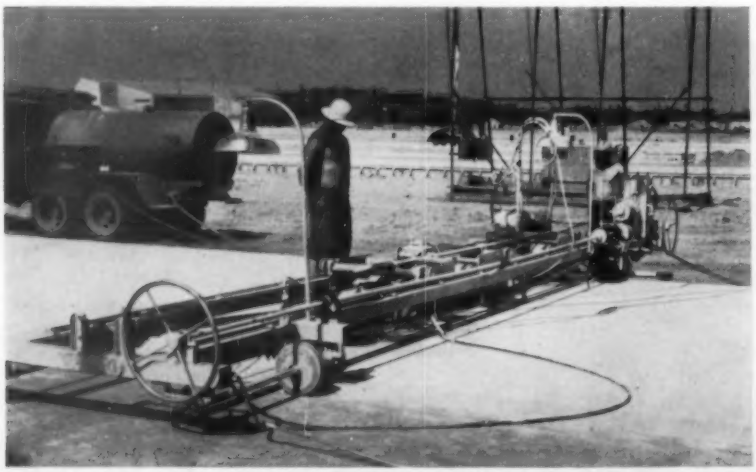
● High-powered flood lighting unit helped Winkelman-Tompkins-Jones "light everything up like a ball park."

● A pair of Jaeger-Lakewood finishers, each with two oscillating screeds, was followed by Koehring longitudinal float. Note how adjacent pavement has been cleaned off by grader blade.

lar. Metal key strips, which are tied to the forms for each use, are removed and carried ahead on a flatbed Dodge 4-wheel-drive Power Wagon.

Of interest is the lane sequence employed on the 54-lane apron. For this 1080 x 8000 ft. pavement the pavers took every 7th lane, working down one side and back on the other. This has permitted batch delivery and sprinkler operation over 14-day or older adjacent concrete, as allowed under specifications.

Batch hauling is done with 21 Mack B-30 2-axle trucks equipped with Daybrook 3-compartment bodies.



● Special patented joint sawing machine, designed and used by Seals, Inc., joint sawing specialists on the Winkelman-Tompkins-Jones paving work.

Aggregate Production At Plattsburg

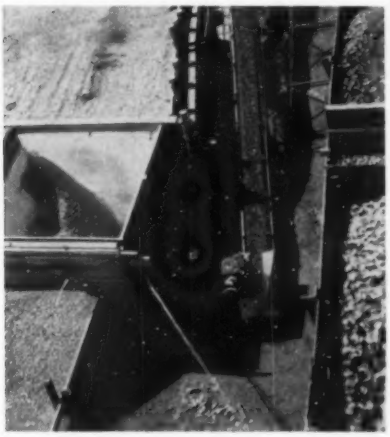
to be reviewed in a separate article which describes two large special crushing plants set up by the contractors.

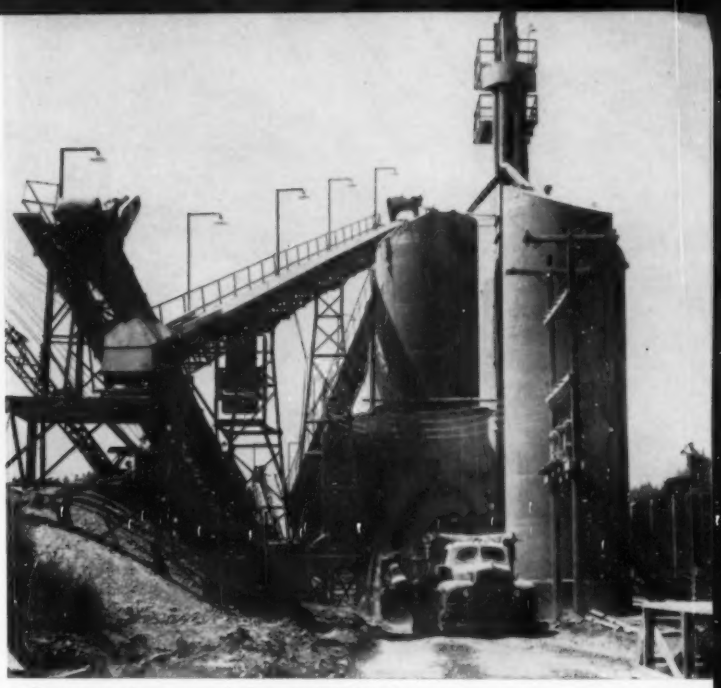
The smaller trucks are preferred over the 10-wheelers because of the sandy going. Trucks are equipped with a push block in front, and also with a towing cable threaded under the chassis and anchored to the frame at the rear spring shackle. A D6 Caterpillar dozer with 3-in. pusher pin welded on the apron gives pusher or cable-pull service in soft sand.

Winkelman-Tompkins-Jones under the Corps specifications has elected to use a 2½-in. maximum stone separated at the crusher into three sizes (2½, 1½ and ¾ in.).

The company's unique all-electric batch plant is a Johnson-designed as-

● Looking down on one of the receiving bins showing also (below) adjacent stockpiled material and lower belt flights taking material from the tunnel.





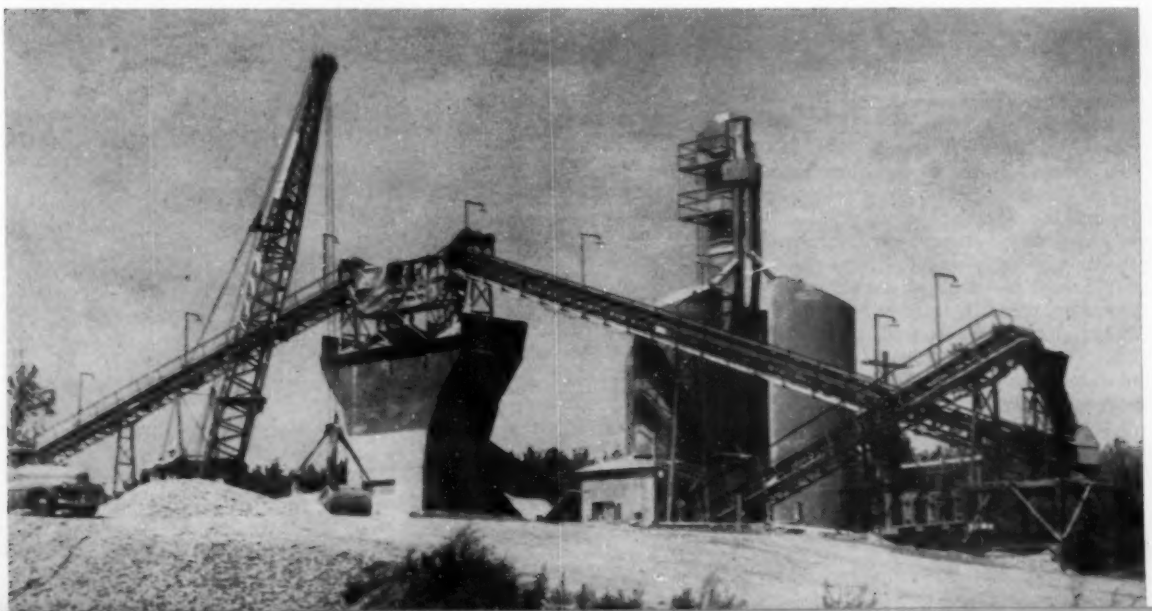
● Large capacity cement dock at the W-T-J plant.

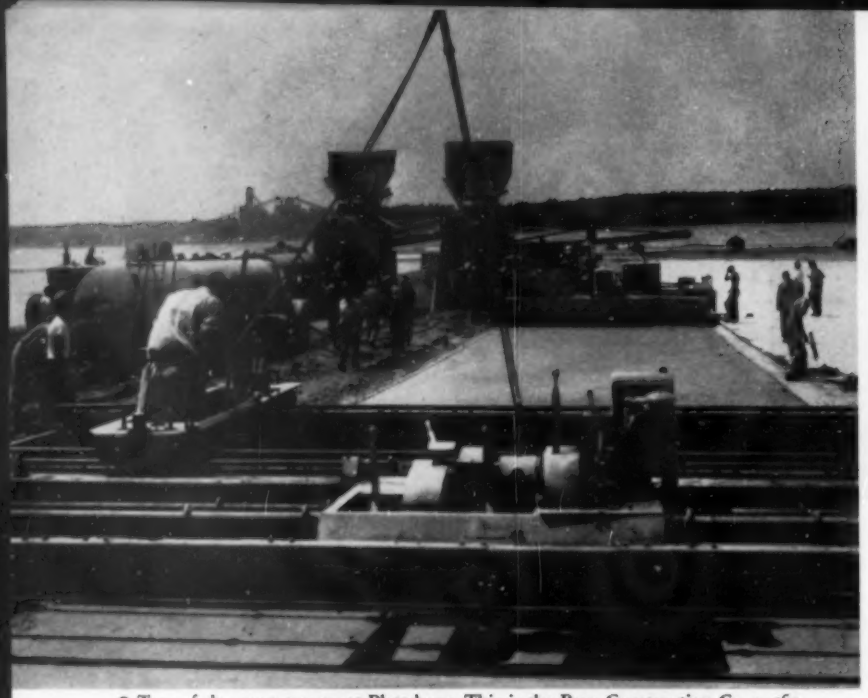
Big Batch Plant

as Set Up by Winkelman-Tompkins-Jones

● Swiveling chute supplies either of two aggregate sizes to proper bin compartment.

● Winkelman-Tompkins-Jones batch plant — two sets of conveyors each with three flights take aggregates to 4-compartment bin in tower. Manitowoc 2½-yd. clamshell supplements from stockpiles when delivery trucks arrive irregularly. Plant is Johnson-designed.





● Two of the seven pavers at Plattsburg. This is the Bero Construction Co. outfit.

sembly in which aggregates are fed to a 125-ton 4-compartment bin by two conveyor systems, each having three Atlas 24-in. belt units. Stone and sand are delivered by truck to submerged hoppers, a pair for each conveyor system. The left set of conveyors takes sand and 2½-in. stone to the tower bin; the right belt series handled 1½ and ¾ in. stone.

Each bin gate is controlled by a push button at the operator's station on top. Through push-button switches the operator also can start or stop any belt unit independently of the others. *(Plant photos on p. 81.)*

What happens goes something like this, with variations: The operator, on seeing that the sand bin is getting low, turns a 2-position swivel chute, located at the top of the left side conveyor flight, to the sand position. Then by remote electrical control he opens the gate under the submerged sand hopper down below, and simultaneously starts the lower of the three belts in the left conveyor flight. The second and third belt are also started, one by one, as the material reaches them. When the bin is about full, he reverses the procedure by shutting the hopper gate and successively stopping the three belts as their load runs out.

When 2½-in. stone is wanted, the swiveling chute is switched to the 2½-in. stone compartment and the foregoing steps are repeated, beginning by opening the gate under the submerged stone hopper.

At the same time, or independently, the same series of operations can be turned on or off to operate the right-hand flight and raise the bin level for either 1½ or ¾ in. stone, using a second swiveling chute.

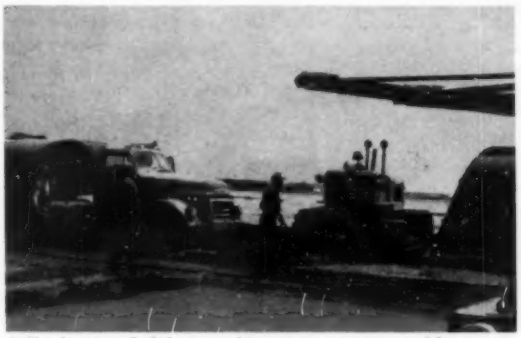
Supplementing when necessary to maintain material flow despite uneven truck arrivals, a Manitowoc 2½-yd. crane is stationed between the receiving hoppers. Small auxiliary stockpiles of aggregates are built up beside the crane, so that hoppers can be fed at times when direct truck-to-hopper delivery is delayed. One clamshell crane performing auxiliary service thus is ample for this plant's output of 1,700 to 2,700 37.4 cu. ft. batches per 20-hour day.

The cement dock located along a rail spur consists of one 550 and three 825 bbl. Johnson silos fed by an under-track screw. The entire plant is maintained in two-shift operation with 11 or 12 men including the foremen. Power at 220 v. is supplied by the public utilities.

Bero's Paving Contract

For its 165,000 cu. yd. of paving concrete, the Bero organization worked one shift this summer. The paving equipment included Heltzel forms, a Buckeye subgrader, two Koehring 34-E's, Jaeger screw-type spreader, an 8-unit Maginnis Hi-lectric full-slab vibrator attachment, two Jaeger-Lakewood finishers, Koehring longitudinal finisher, and a spray machine applying Servicized materials. A Bucyrus-Erie 22-B crane resets form-riding units between lanes.

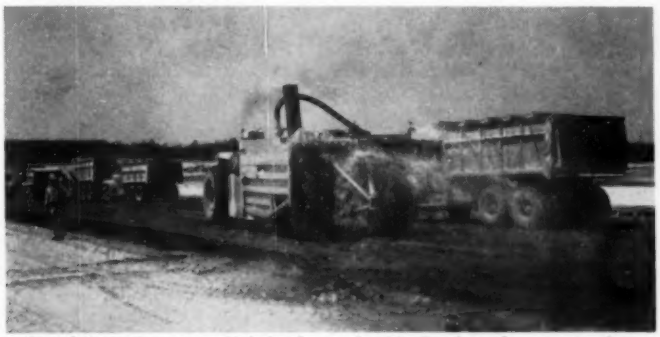
● Bero's big capacity cement dock, and second dock in rear.



● Equipment helping equipment — tractor with tow chain has just snaked the semi-trailer water tank up to the paver.

● Grader operator pauses to help a water truck out of difficulties with his blade corner.

● Motor grader constantly patrolled path to paver.



● Sprinkling plus top soil helped get the big batch and water trucks over the sand.

HOW BERO'S EQUIPMENT WAS KEPT MOVING

The Bero force has placed as high as 2,000 lin. ft. per 10-hour day despite its share of troubles in sandy soil. Their most helpful aid, next to liberal sprinkling, has been to "borrow" topsoil for temporary stabilization of haul road to the pavers. Top soil was later removed, prior to paving the area.

A tractor or motor grader is always on hand to assist batch trucks. For batch hauling the company is using six Mack B-42 10-tired trucks (5-batch) and five Mack B-30's (3-batch). This observer noted that the larger dual-axle trucks sometimes had considerable difficulty in the sand.

Water wagons of Bero's design also included some "monsters," such as two C Tournapulls and one LaPlant-Choate TS-300 scraper, each with scraper pan replaced by a 4,000-gal. tank. The sprinkler system in each instance is designed for lateral throw as well as rear.

Bero elected to use a 2-in. aggregate separated at the crusher into two sizes (2 in. and 1 in. max.).

Bero's batch plant on a rail spur next to the job consists of two aggregate bins equipped with Detecto aggregate scales: a Bucyrus-Erie B-38 with Blaw-Knox 2-yd. clamshell; a Blaw-Knox cement dock comprising one 400 bbl. and three 600 bbl. silos, with under-car screw and Hardy scales; also an auxiliary 800-bbl. cement dock. The plant handled 1,251 batches on a typical 10-hour day with only one aggregate bin.

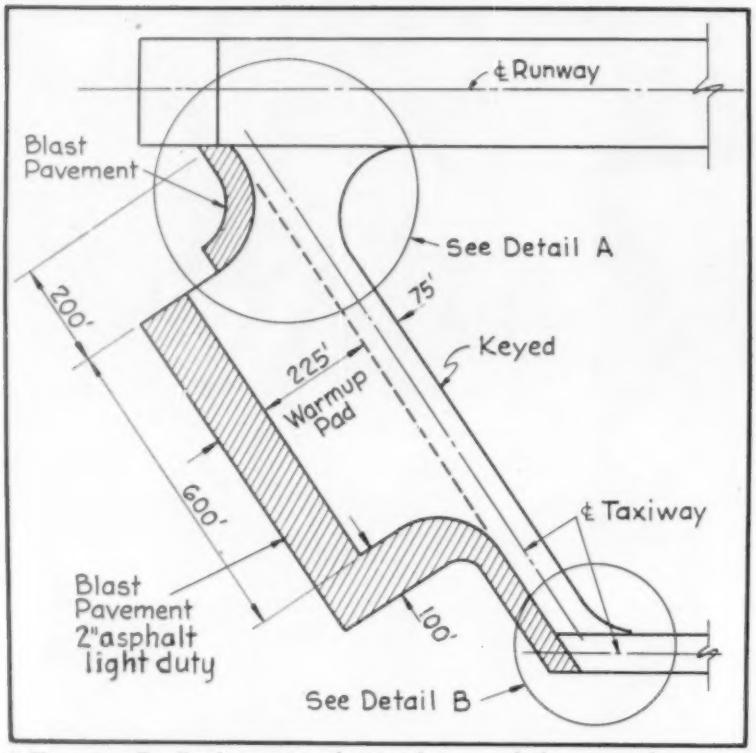
Both contractors have used radio-telephone heavily. Winkelman-Tompkins-Jones has 11 Motorola equipped cars or pickups linking office, shop, crusher, batch plant and pavers. Bero has 6 Motorola mobile units working through General Electric base station equipment.

Contractors Saw Joints

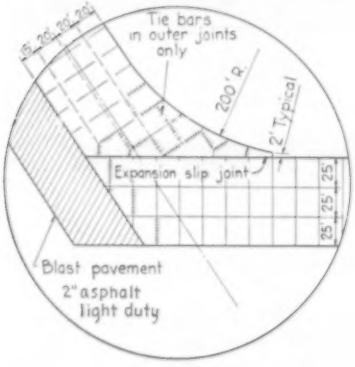
Specifications at Plattsburg give a choice of hand-forming or sawing joints. The contractors at first favored hand-forming, but with Corps of Engineers encouragement they further investigated sawing methods and costs and subsequently found the method to their advantage.

Winkelman-Tompkins-Jones has hired Seals, Inc., of Baltimore, to do joint sawing and sealing. This specialist organization got its first big start on the West Virginia Turnpike in 1954*. The Seals equipment consists of a patented track-type unit on which

*"Eleven Pavers Set Pace on West Virgina Turnpike," ROADS AND STREETS, October, 1954.



● Figure 5 — Details of warm-up pad, connecting one end of runway and main taxiway.



Detail B

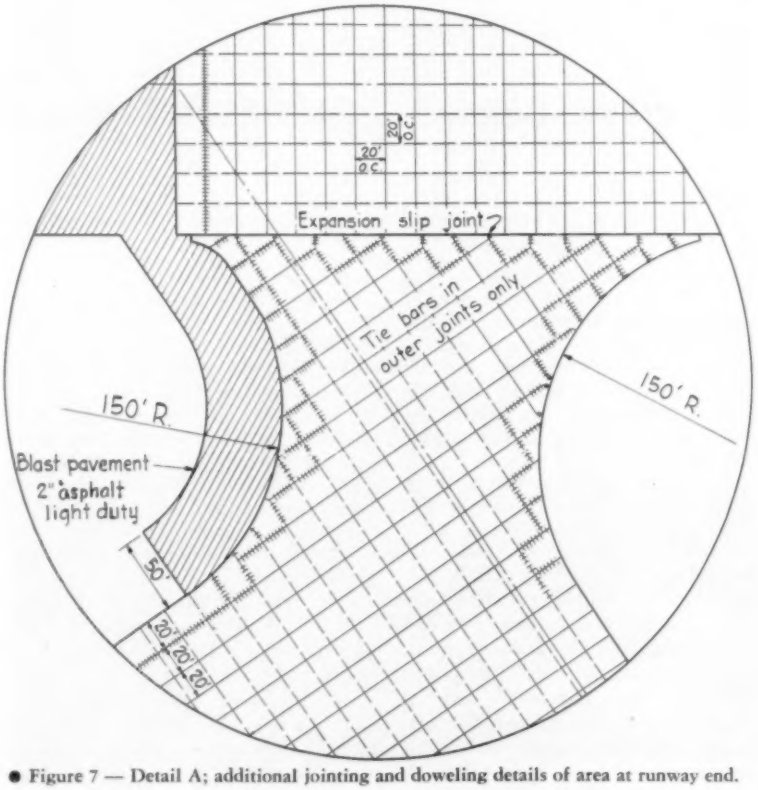
● Figure 6 — Showing typical joint and doweling pattern at warm-up pad and taxiway end.

three 14-in. saws are mounted on individually controlled dollies. The saws are powered through individual motors by a Consolidated BG30 25-kw diesel generator, mounted on an Army truck along with a 1300-gal. tank for spraying the cutting blades. The generator also supplies 500-watt flood lamps mounted on the machine.

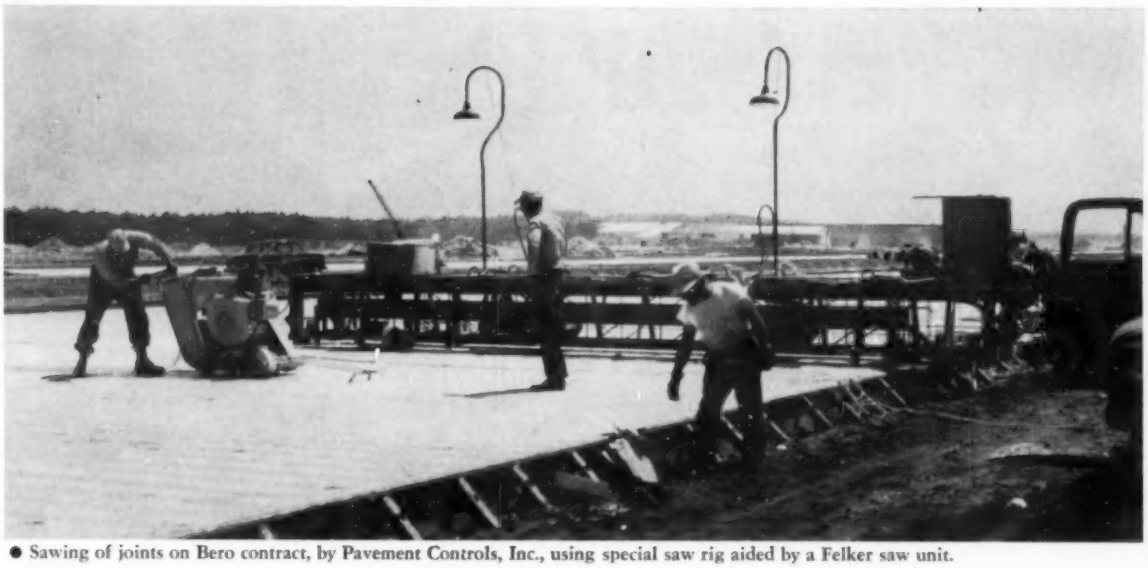
Seals, Inc., began with experimental use of diamond and also carbide abrasive type blades. The firm is now using a diamond blade of its own design, with which it is reportedly averaging up to 1,000 lin. ft. of T/6 joint per blade. The joint cutting crew covered 75,000 lin. ft. of joints in 1954. Recently 5,300 to 5,400 lin. ft. of T/6 joint has been cut per double 10-hour shift with the Seals equipment.

Bero Construction Co. has also sublet its sawing and sealing to R. E. Scatterday, of Cleveland, which in turn is using Pavement Controls, Inc., of Cleveland. This specialist which has had extensive experience on the Ohio Turnpike also employs a bridge machine apparently copied after the Seals unit; powered by a General Motors diesel generator on a truck which carries a 500-gal. water tank. A Felker saw unit serves as an auxiliary. Blades were averaging 30 to 40 20-ft. joints each, cutting to T/4 or 3-1/3 in. depth.

On the Bero paving a special machine is being watched with interest in connection with joint forming. Located between the finishing machines and the longitudinal float is a bridge unit designed by Vibro Tamper of Dallas. Its function is to create, by lowering and raising a vibrating V-shaped edge, a dent in the freshly struck-off concrete which will be filled with mortar during the subsequent



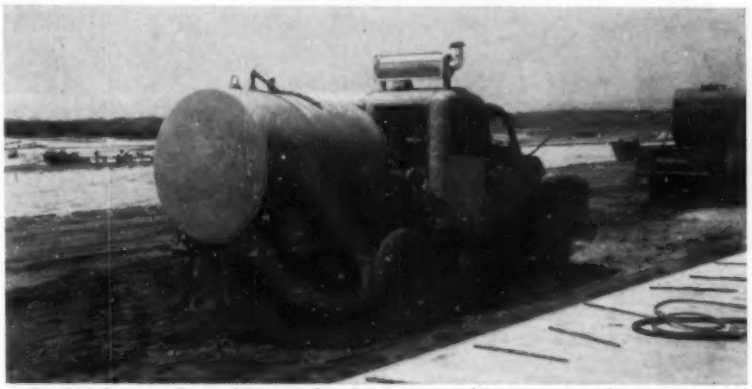
● Figure 7 — Detail A; additional jointing and doweling details of area at runway end.



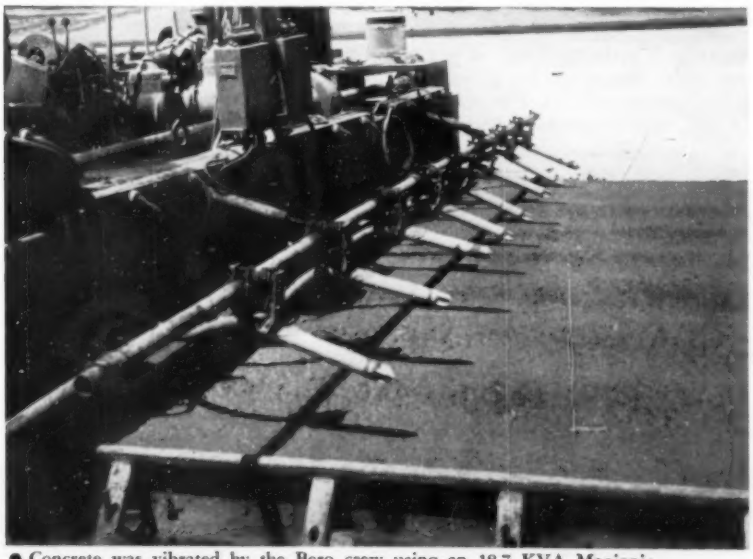
● Sawing of joints on Bero contract, by Pavement Controls, Inc., using special saw rig aided by a Felker saw unit.

hand floating and final finishing. This dent is located at the exact point of the dummy joint. Its purpose is to leave a narrow strip relatively free of coarse aggregate in the upper part of the slab, so as to reduce the abrasive resistance to sawing. Data on this device are not presently available.

At this writing the large mass of data being gained in the 1955 cutting operations has not been fully studied and evaluated by the Corps personnel. However, the policy of cutting joints in sequence has been generally satisfactory. Some uncontrolled cracking has occurred, but such cracking is not considered a serious problem. The



● Serving the saw: General Motors diesel generator and large water tank.

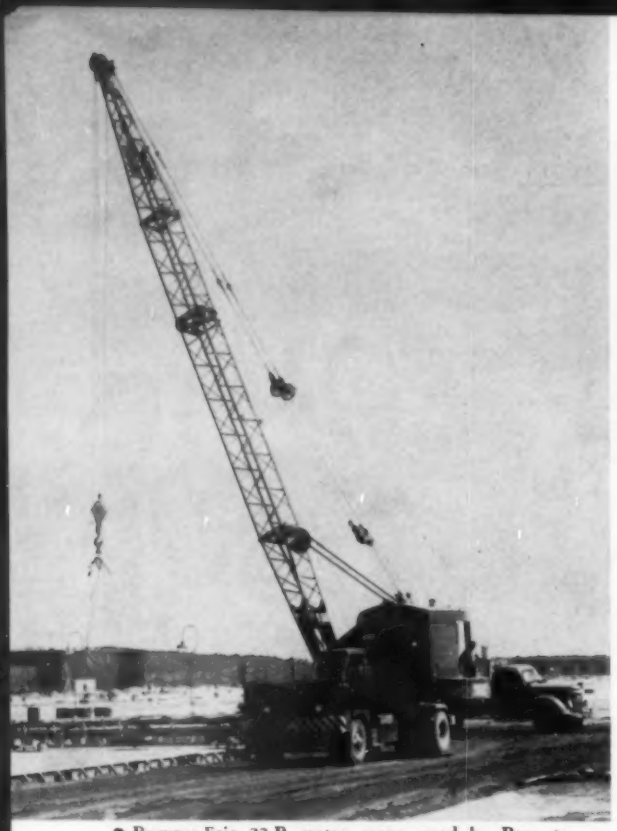


● Concrete was vibrated by the Bero crew using an 18.7 KVA Maginnis Hi-lectric full-slab vibrator attachment, raised or lowered hydraulically from the spreader mechanism.

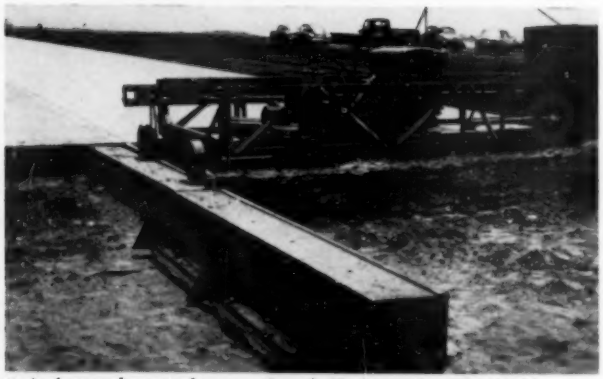
delay interval for sawing is the "$64 dollar question." Sawing begins anywhere from 6 to 12 hours after pouring when air temperature is between 65 and 80 deg. F., and up to 33 hours between 35 and 50 deg. The policy is to encourage prompt sawing to avoid uncontrolled cracking, even at the risk of some raveling.

During 1954 work it was noticed that joints sawed to T/6 depth, or 2.33 in. for 14 in. slab thickness, often resulted in cracks forming at only every fourth joint, these cracks sometimes opening up to a width of ¼ in. or more and threatening the aggregate interlock. In an effort to bring about more even cracking at joints, sawing to T/4 depth was ordered for a section of the Bero work. The deeper saw cut however has not fully solved the problem which was being further investigated during 1955.

While cost data on sawing have not been given out, it is estimated by the engineers that T/6 joints cut 1/8 to



● Bucyrus-Erie 22-B motor crane, used by Bero to move equipment from lane to lane.



● At lane-ends: two form sections built into a box to provide support for rubber-tired rollers on the spreaders and finishers.

● Inspecting the project: Lt. Col. Richard Hackford, representing the Air Force, and the W-K-T project manager, William Robinson.

3/16 in. wide have cost the contractor about 25 cents per running foot, with T/4 joints costing something over twice this sum.

No attempt is being made to keep joints clean prior to filling, such efforts being considered more costly and troublesome than they are worth. Joints are blown out with air, cleaned with a power-driven wire brush, and filled by conventional methods, using rubber-asphalt compound or jet resistant filler. On the Bero end the cleaning brush, applicator cart and jacketed heater are by Joint Equipment Co.

Acknowledgments

William Robinson is project manager for Winkelman-Tompkins-Jones, and Charles Cunningham project manager for Bero Construction Corporation.

For the Corps of Engineers the Plattsburg construction is supervised by Lt. Col. Samuel H. Duerson, Resident Engineer, with W. H. Jennings Assistant Resident Engineer. The projest is being directed by Col. John T. O'Neill, District Engineer, New York district of the Corps. The ROADS AND STREETS Editors wish in particular to thank Harry Sarkisian, Paving Engineer, and Harold Meyer, Chief of the field laboratory, for supplying data for this report.

A.E.D. announces 37th annual meeting dates

Associated Equipment Distributors, the National Trade Association of the Construction Equipment Industry, announced recently that their 37th Annual Meeting will be held *January 29 through February 2, 1956* at the Conrad Hilton Hotel in Chicago, Illinois.

A.E.D.'s 1956 Convention Committee, headed by W. A. Patterson, Richards Equipment Co., Waco, Texas, is planning a program designed to capture the interest of the more than 3,000 distributors and manufacturers of construction equipment expected to attend the meetings.

Others on the committee include S. G. Marks, Marks Tractor & Equipment Co., Cleveland, Ohio; Don F. Nickel, Don F. Nickel Equipment Co., Grand Rapids, Michigan; R. F. Newlin, Newlin Machinery Corp., Kansas City, Kansas; and C. C. Tambornino, The George T. Ryan Co., Minneapolis, Minnesota.

● Average trip length on the New York State Thruway is averaging 64 miles for passenger cars, 84 miles for trucks. Passenger car trip lengths have run higher during the summer, due presumably to vacation traffic.

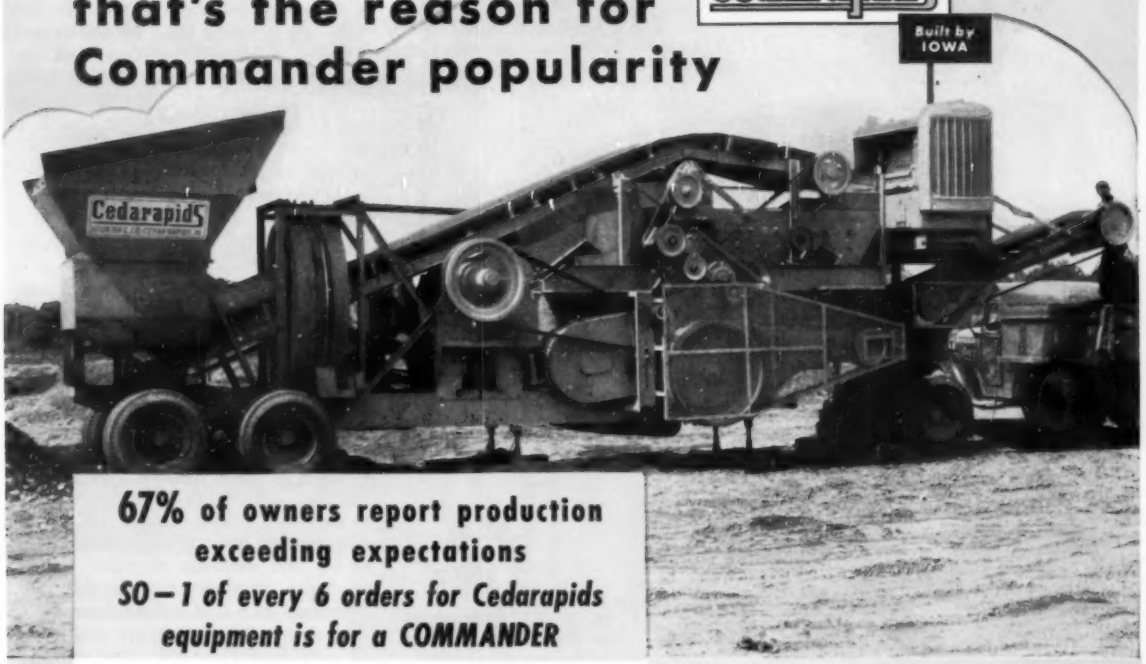
● In Chicago to plan for the American Roadbuilders Association convention and Roadbuilders show, to be held there early in 1957: Eugene Reybold, Association's executive vice-president; Barton F. Fuller, managing director, contractors division; Norman Almquist, administrative service manager, and Loren Wells, right, manufacturers sales executive of Detroit Diesel Engine division of General Motors after visiting the division's roadbuilding exhibit at Powerama.

BONUS PRODUCTION

that's the reason for Commander popularity

Cedarapids

Built by IOWA



67% of owners report production exceeding expectations

50—1 of every 6 orders for Cedarapids equipment is for a COMMANDER

420 tons per hour producing 7/8" with 15 to 20% crushing . . . 400 tons per hour of 1¼" material with 12% crushing . . . 275 tons per hour of 1" material with 20% crushing! These are typical reports received from Cedarapids Commander owners all over the world. It is little wonder that it is the most popular aggregate producing plant with contractors and pit operators today.

Join the growing group of satisfied Commander owners. You will have a machine that was designed to meet the conditions of modern road building that call for higher percentage of crushing of pit material, finer aggregates and lower operating costs. See your Cedarapids distributor today for the complete story.

FEATURES THAT MEAN PROFITS FOR OWNERS

- ***New 30" x 25" Secondary Roll Crusher***
  This new roll crusher provides 12% more secondary crushing yet handles the same size feed. This new larger size balances the high screening capacity of the Commander's big screen.
- ***Large Horizontal Vibrating Screen***
  To handle the higher percentages of secondary crushing, the big 48" x 10' 2½-deck screen gives the Commander 30% more screening capacity than plants of comparable size. The Cedarapids Horizontal Vibrating screen provides most accurate grading and allows lower overall height.
- ***Efficient 10" x 36" Jaw Crusher***
  The high primary crushing output of this unit keeps the plant operating at peak capacity. Cedarapids Jaw Crushers are of a forced feed overhead eccentric shaft design engineered for extra-high capacity and low cost performance.
- ***Wide 30" Conveyors***
  Feed conveyor, delivery conveyors and under-crusher conveyor are extra wide to handle the greater capacity of the Commander. Channel conveyor frames combine light weight with exceptional strength.

IOWA MANUFACTURING COMPANY

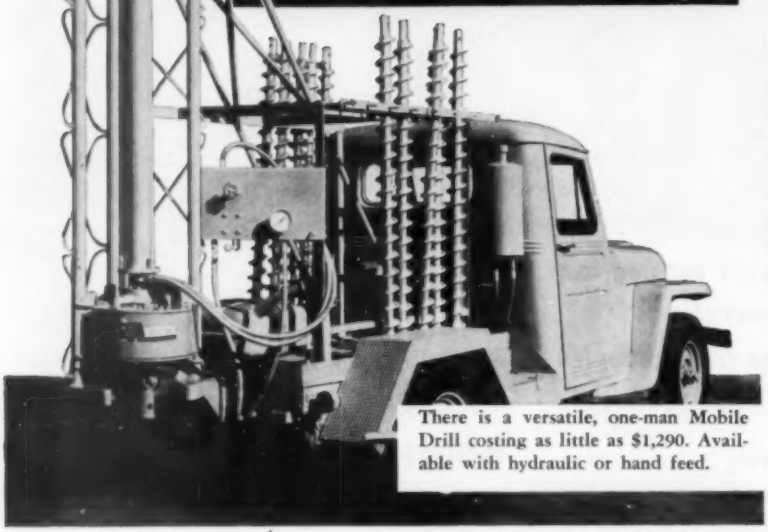
Cedar Rapids, Iowa, U.S.A.

. . . for more details circle 259, page 16

DRILLING

to Investigate Underground Conditions

the **MOBILE*** *way!*



There is a versatile, one-man Mobile Drill costing as little as $1,290. Available with hydraulic or hand feed.

. . . a few of the users of MOBILE DRILLS:

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- *Board of County Road Commissioners (Grand Rapids)
- *Delaware Geological Survey
- *S. J. Groves Constructions
- *Peter Kieweit and Sons
- *Moss-Thornton Company, Inc.
- *Western Contracting Co.
- *Williston Shell Rock Co.
- *80% of State Highway Departments.

There's nothing like a Mobile Drill —for low original cost—for versatility—and for maneuverability. Mounted on a Jeep or a 4-wheel-drive truck, the rugged, lightweight Mobile Drill can be transported over roughest terrain.

It's better to be safe—rather than sorry when making a bid. It costs so little with a Mobile Drill. Be sure —get your sub-soil information the Mobile Drill way! Write for full information—no cost or obligation.

* *World's Largest Manufacturer of Light Vehicle Powered Drills*

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. . . for more details circle 250, page 16

New Publications

Engineering geology

GEOLOGY IN ENGINEERING is the title of a new text book by Shultz and Cleaves published in New York by John Wiley, & Sons, 440 Fourth Ave., New York 16, N. Y., and in London by Chapman and Hall. Already it has been adopted by more than 15 schools as a text and practical reference including Michigan, Purdue, Iowa State, Washington University, Lehigh and others.

As we older engineers know and the preface states "Practicing engineers come into almost daily contact with geological matters, and there has long been a need for a book which introduces them to the phases of geology that experience shows to be the most useful in their work. There is perhaps, an even greater need for a book acquainting geologists employed in engineering work with engineering practice." The book gives a systematic account of geologic principles and methods of value to the geologist. It places considerable emphasis on soils and soil mechanics.

A variety of subjects are treated as to principles involved, case histories and practical application of principles. The authors through their long years of experience on day-to-day dealings with engineers and geologists all over the world are particularly well qualified.

The book is fully up-to-date and apparently no competent authority or technical procedure has been overlooked. Chapters include geologic structure, historical geology, geologic maps and sections, aerial photographic interpretation of soils, and subsurface exploration, all as related to rocks, streams, shore lines, earthquakes, soils, dams, tunnels, highways, airfields and other structures.

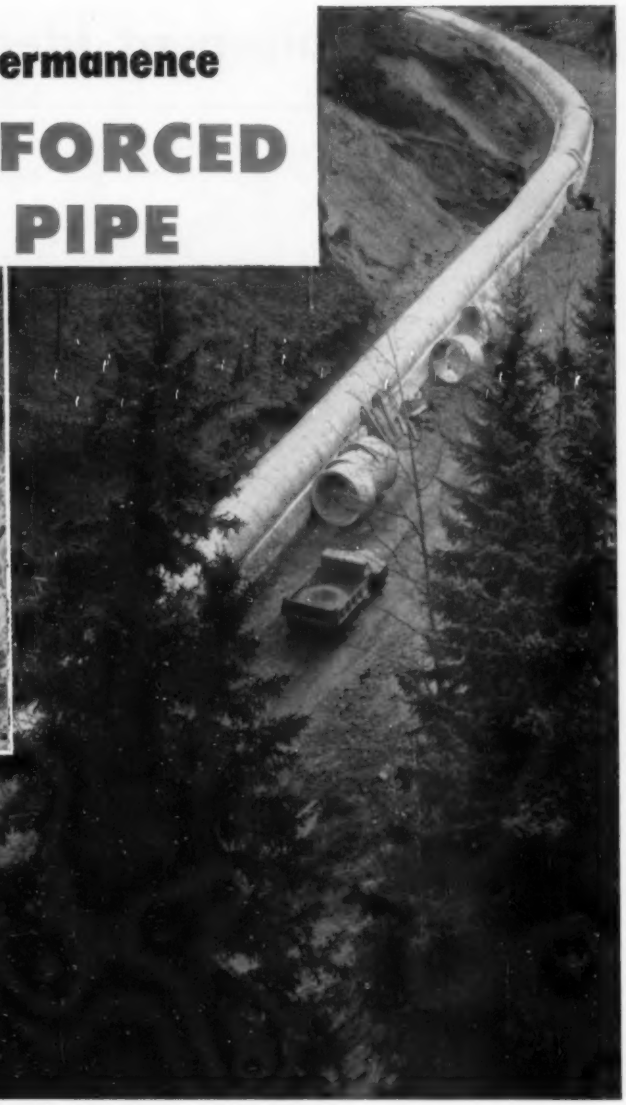
The several hundred references include such authorities as Terzaghi, Casagrande, Proctor, Kersten, Wood and many others.

A long felt need is at last being met.

VEHICLE OPERATION AS AFFECTED BY TRAFFIC CONTROL AND HIGHWAY Type. Bulletin 107 — Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C. Contains three papers, given by Carl C. Saal, Roy H. Fielding and Thomas E. Young and A. D. May, Jr., on topics related to this subject.

For strength . . . for permanence

SPECIFY REINFORCED CONCRETE PIPE



EXTRA-EXTRA STRENGTH. This 60" extra-strength reinforced concrete culvert pipe was laid in a curved bedding that conforms to the shape of the pipe. Purpose was to distribute stresses more evenly throughout the pipe . . . assure maximum strength.

COMES THE DELUGE, this giant 84" storm sewer at Edmonton, Canada will easily carry off the excess run-off. The pipe snakes through the hills right under a new 4-lane highway. Concrete pipe, reinforced with welded wire fabric, provides the needed strength and durability of this permanent installation.

SEWERS AND CULVERTS—especially those that burrow under highways or heavily travelled city streets — need exceptional strength and durability. That's why so much reinforced concrete pipe is used.

American Welded Wire Fabric is an ideal reinforcement for concrete pipe. It gives the pipe a tough, strong backbone. The high yield strength wires, accurately spaced and welded at all transverse wires, provide special anchorage in the concrete at all welds and thus hold the concrete tightly together so that hairline cracks won't open up. It comes in a complete range of styles and weights and is now available in circumferential wire sizes up to and including ½" in diameter at 2", 3" and 4" on center.

Specify American Welded Wire Fabric for long lasting concrete *pipe.*

BE SURE TO ASK **"is it Reinforced"**

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

EVERY TYPE OF REINFORCED CONCRETE CONSTRUCTION NEEDS

USS AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL

. . . for more details circle 181, page 16

Job and Equipment Ideas

● Note hardwood wedge under tire of motor grader, helping it to ramp down onto the sub-grade from a concrete bridge deck.

Hardwood wedges help get equipment in

Glimpsed under one wheel in the accompanying picture of a Caterpillar 12 motor grader is a hardwood wedge, which has proved to be a remarkably useful item for Charles L. Harney, Inc. of San Francisco.

Under the circumstances pictured, a pair of the wedges are placed against the edge of the concrete bridge deck, enabling the grader operator to climb easily on to the desk from the paving sub-grade.

These same wedges are used, singly or in pairs, in a different way. By placing them immediately next to the paving forms on the inside and outside, the grader can angle up and over the rail without subjecting it to damaging pressure.

The wedges are of a size convenient for handling by two men.

Swiveling pipe brackets

Faced with the problem of equipping trucks with pipe racks which would get through narrow alleys and tight doorways, Soule Steel Co. of San Francisco, Calif., solved the trouble by making hinged brackets which fold back when not in use.

As shown, the racks are made on a steel shaft which fits through a pipe sleeve, notched in a way to lock the bracket in the open or close position. A heavy compression spring at the base prevents the locking lug from becoming displaced as the truck bounces over rough roads.

● Showing novel swiveling pipe support, rotated back in position for travel when not in use.

ACI to discuss bridges at southeastern meeting

The American Concrete Institute's Southeastern regional meeting, Atlanta Biltmore Hotel, Atlanta, Georgia, (October 31 and November 1) will have program papers on the following subjects: Construction of Dauphin Island Bridge and Lake Pontchartrain Bridge, thin-shell precast concrete, silicone water repellents for masonry, lightweight-aggregate concrete, concrete masonry wall construction, cracking of masonry walls, concrete stress distribution in flexure, diagonal tension, and concrete shear strength.

Additional contracts awarded on Florida Turnpike

Contracts expected to be awarded during September brought to 73.6 miles the total of work awarded for the 104-mile turnpike between Miami and Ft. Pierce, Florida.

Five remaining contracts covering 30 miles will be awarded by November 1, according to the Florida State Turnpike Authority which will also begin taking bids soon on bridge, roadbed and base construction.

● A contract in excess of $11,000,000 has been awarded to a joint venture of Johnson, Drake & Piper International Corporation, of New York, and Merritt-Chapman & Scott Corporation, of New York, for construction of six advance warning radar bases in Labrador and Newfoundland. The contract will include access roads, communication facilities and necessary utilities. The Corps of Engineers, Eastern Ocean District, is the contracting agency.

● $15 million in highway bonds have been sold by the Alabama Highway Authority, at a cost of 2.73 per cent.

Making Time on the N.Y. Thruway!

Le Roi 600 cfm compressor and Cleveland T-286 drill rig speed drilling operation

Motorists aren't the only ones who travel fast on the N. Y. Thruway. Contractors had to make plenty of time, too.

That's why this contractor made a mobile drilling unit out of his D-8 Cat. He used as components a Le Roi 600 CTM compressor and the Cleveland T-286 drill rig.

The compressor is designed especially for use with D-8 or TD-24 tractors. It is the only unit that attaches directly to the PTO and has a clutch as well. Capacity of the unit is 600 cfm.

The T-286 drill rig consists of two Cleveland patented air feeds, and Cleveland 4" drifters with air-motor booms. Here, it is mounted on the front of the tractor and has a spread of 220 degrees suitable for any variable drill pattern. Ten-foot steel changes, faster set-ups, better hole spacing, greater footage, better fragmentation—mean faster drilling and lower costs.

If you want to make time and cut costs on your rock jobs—just put an old tractor to work this way. Write us for literature that tells how.

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS • TRACTAIR • STATIONARY AIR COMPRESSORS • ENGINES • AIR TOOLS • TRUCK MIXERS • FRONT-END LOADERS

C-159

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. . . for more details circle 219, page 16

NEW YORK THRUWAY CONTRACTOR ORLANDO SHOWS . . .

how to keep your shovels busy

A. J. Orlando Contracting Co. of Whitestone, New York, won a sub-contract to excavate and move one million yards of earth and rock on the anchor end of the New York Thruway. The job had to be completed before snow and other winter conditions set in—and this meant fast stepping!

To keep cycle time down, dynamic Anthony Orlando set up schedules that would keep the shovels constantly busy with a minimum number of trucks. This was a job made to order for his fleet of Mack six-wheel dumpers, bolstered by five new Mack LJSW-X six-wheelers.

Despite heavy rains and unusually soft going, the contract was carried out at a rapid pace to a successful conclusion. Says President Orlando, "For jobs like this, Macks are the only trucks I can afford to operate."

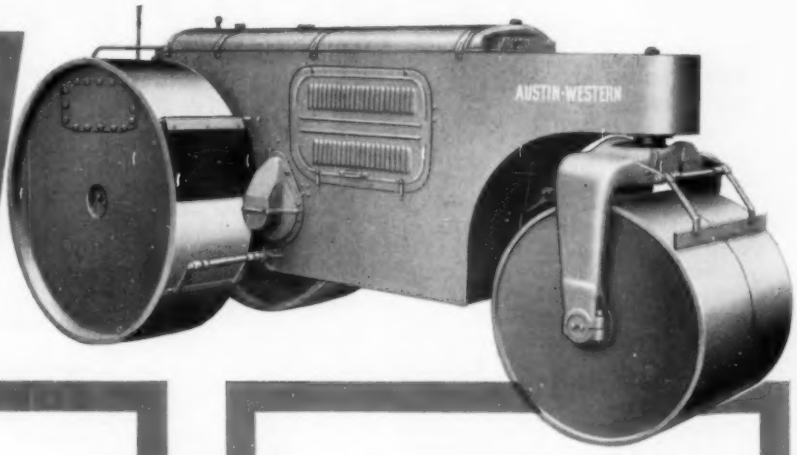
Macks are the mainstays of many a contractor who must keep up fast and uninterrupted hauling schedules. The famous Mack Balanced Bogie provides sure-footed traction in soft or slippery going. And when it comes to shrugging off punishment, Macks are in a class by themselves.

Have your Mack branch or distributor show you why, like Mr. Orlando, you can't afford *not* to operate Macks.

MACK TRUCKS Empire State Building, New York 1, N. Y.

. . . for more details circle 227, page 16

COMPLETELY NEW



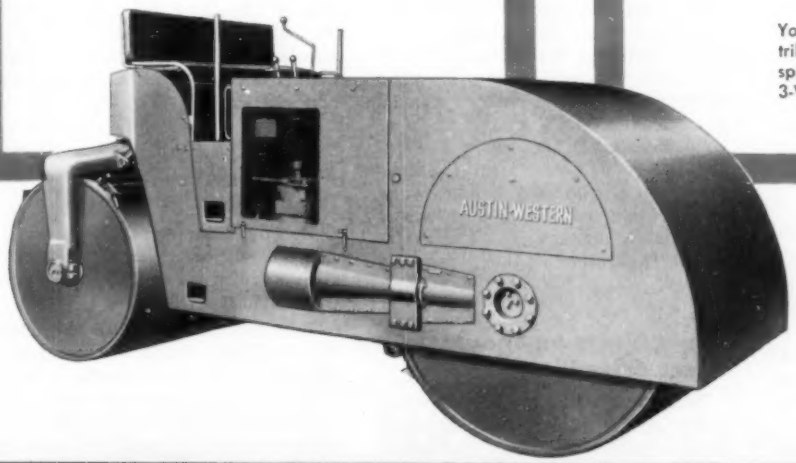
TANDEM ROLLERS

- *NEW* **Torque Converter Drive** . . . smooth, powerful, flexible
- *NEW* **Variable Weight** . . . rolls designed for water or wet sand ballast
- *NEW* **Full-Width Seat** . . . with dual operating controls
- *NEW* **Visibility** . . . with low center of gravity, and high ground clearance
- *NEW* **Gasoline or Diesel Engines** . . . 2-speed or 4-speed transmissions
- *NEW* **Accessibility** . . . servicing all assemblies is quick and easy

3-WHEELED ROLLERS

- *NEW* **Torque Converter Drive** . . . smooth, powerful, flexible
- *NEW* **Variable Weight** . . . rolls designed for water or wet sand ballast
- *NEW* **Visibility** . . . with low center of gravity, and high ground clearance
- *NEW* **Gasoline or Diesel Engines** . . . 2-speed or 4-speed transmissions
- *NEW* **Torque Proportioning Differential** . . . maintains traction under difficult conditions

Your nearby Austin-Western distributor will gladly furnish complete specification sheets of Tandem and 3-Wheeled rollers.



Austin-Western

Power Graders · Motor Sweepers

Road Rollers · Hydraulic Cranes

BALDWIN BLH LIMA-HAMILTON

Construction Equipment Division

Manufactured by

AUSTIN-WESTERN COMPANY

Subsidiary of Baldwin-Lima-Hamilton Corporation

AURORA, ILLINOIS, U.S.A.

. . . for more details circle 182, page 16

DIGEST of Current Technical Literature

By JOHN C. BLACK, Associate Editor

Another wind hazard for bridges

"Research carried out at the National Physical Laboratory on scale models of the proposed Runcorn-Widnes suspension bridge has revealed a hitherto unknown hazard, that of wind buffeting, caused by an adjacent railway bridge. With the proposed design a 40 mph, wind would have caused a rise and fall of the bridge decks at the quarter-span points of about 12 in. A stiffer design would reduce this hazard but would increase cost and it has been proposed that a steel arch bridge should be constructed instead of a suspension bridge. It has been found that buffeting varies according to the distance between bridges, and it appears that bridges should be very close together or be separated by much more than 100 ft. Buffeting can be reduced by stiffening the suspension bridge or by modifying the design or shape of the other bridge. Hills, cliffs or very large structures of any kind may also give rise to buffeting. The article also includes some references to aerodynamic research carried out in connection with the design of the Severn Bridge."

"Aerodynamic Research in Relation to Bridge Design: A Progress Report and Commentary" by J. M. Berskine. SURVEYOR, *London, 1954, 113 (3270), 955-8.* ROAD ABSTRACTS *(England), Vol. 22, No. 4, p. 58, April 1955, here quoted from* HIGHWAY RESEARCH ABSTRACTS, *Highway Research Board, 2101 Constitution Ave., Washington 25, D. C., May, 1955.*

Psychology tests in traffic courts

Psychological factors in the problem of making our streets safer are presented with unusual clarity in a 17-page article on the development of Chicago's new traffic court. Applicability to rural conditions is obvious, as is also the relation of these factors to the issuance of drivers' licenses.

In planning the new machinery, Chicago authorities studied especially the accomplishments of New York, Los Angeles, and Detroit; and based their final plan largely on that of the latter city. This applies to organization, method of operation, and physical plant. Details of tests and treatments are not discussed in this paper. As will be understood, the objective is not merely punishment and restraint, but the correction of personal faults in drivers and the provision of special training where practical.

Skilled psychologists were employed in making the plan, and a considerable force will be used in its operation. A lengthy quotation from one of the experts contains the following: "Not by choice, but by necessity, have we been studying the problem of driver behavior. What motivates him to break laws, to crash into things, to destroy his own and others' property?" . . . "All of us drive. Drivers are a good sample of the population, and mere regimentation and regulation, it seems to me, must give way to valid tests of driver adequacy, with privileges withdrawn where inadequacy is demonstrated." As in industry persons of low intelligence or with obvious physical handicaps are ruled out automatically from certain jobs, and detailed examination is unnecessary.

"So in drivers, we do not need elaborate research or comprehensive examinations in the extreme cases. We know what to do in extremes. But for the great middle group of drivers, Mr. and Mrs. Average-Driver, we need controlled research along psychologic and psychiatric lines."

It is believed that when fairly established, the new court will make safety administration cheaper as well as more effective.

"A Psychiatric Laboratory Is Planned for New Centralized Traffic Court" by Edward S. Scheffler, Judge of the Municipal Court of Chicago. TRAFFIC QUARTERLY, *The Eno Foundation, Sangatuck, Conn., January, 1955.*

How objects on shoulders affect drivers

"Shoulders along a highway expedite traffic and contribute to driving comfort and safety. This study was undertaken to determine how driver behavior is influenced by parked vehicles or other objects placed on shoulders at various distances from the outer edge of traffic lanes. The objects selected were a passenger car, a truck, and a barricade. Each was placed at the pavement edge, 3 ft. from the edge, and 6 ft. from the edge. Passenger and commercial vehicle speeds and lateral positions were recorded on two-lane highways carrying light to moderate traffic volumes and on a four-lane divided highway carrying up to 3,400 vehicles per hour in one direction.

"For all vehicle types it was found that speeds were not affected significantly by objects on the shoulder. Such objects affected the lateral position of only those vehicles traveling in the adjacent lane. Objects placed at the pavement edge had the greatest effect and lateral shifts decreased sharply when objects were set 3 and 6 ft. from the edge. The narrower the pavement, the further the traffic shifted left, away from the object on the shoulder. On a two-lane 16-ft. highway, the shift was 3.3 ft., while on a 24-ft. surface the shift was 1.8 ft. The various objects — car, truck, and barricade — caused about the same degree of shifting. On narrow two-lane roads, some vehicles shifted over the centerline when the object was placed at the pavement edge."

"Driver Behavior as Affected by Objects on Highway Shoulders" by the Highway Transport Research Branch, Reported by Asriel Taragin, PUBLIC ROADS, *Bureau of Public Roads, U. S. Department of Commerce, Washington, D.C., June, 1955. (Price 20 cents.)*

Los Angeles streets and a proposed monorail

Speedy commuter service to the heart of the city should reduce the number of private cars now entering and leaving daily.

Resulting betterment in street traffic conditions can be reckoned as a plus factor in the economic justification of a monorail system with a total cost of $137,000,000 for construction, right-of-way, equipment and incidentals.

The proposal now being studied calls for a 45.7-mile line in a generally southerly direction from Panorama City near Van Nuys, through Los Angeles to Long Beach. There would be

. . . for more details circle 182, page 16

POWER SHIFT NO CLUTCH TORQUE CONVERTER

HUBER-WARCO 5D-190 (195 H.P.)

POWER!

Tough grading jobs are handled easily and quickly by this 31,450 pound motor grader, powered by a 195 h.p. General Motors diesel engine.

PERFORMANCE!

An Allison Torque Converter protects the unit from shock loads while a full power-shift transmission — WITHOUT CLUTCH — permits quick shifts under full load without interrupting power flow from engine to load. A tail shaft governor automatically adjusts engine RPM to meet any load condition, at any speed set by the operator. Power sliding moldboard is standard equipment.

PROFIT!

These power and performance features have been combined to increase the working capacity of the 5D-190 and reduce costly down-time. With this motor grader it is possible to move more material, with fewer passes. This increased working capacity will add more profit to every job.

For more information write for Huber-Warco 5D-190 literature — Bulletin HWG-508 and Bulletin HWG-510.

For More Details — See Your Huber-Warco Distributor

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MARION, OHIO, U. S. A.

Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

. . . for more details circle 213, page 16

17 stations, including the two terminals.

Maximum train speeds would be about 60 mi. per hr. — average for the entire run, 40 mi.

Passengers would travel by surface car or bus between rapid transit stations and points beyond normal walking distance.

The monorail would be of the overhead suspension type, with T bents spaced about 60 ft. apart, the columns being located in the center of the street to cause minimum interference with surface traffic. Clearance from street surface to underside of cars would be 16 ft.

It is the scale of the job and the combination of features which constitute the novelty of the proposal and require proof of feasability; individually, it is stated, every feature has already been tried and found practical.

The bases of traffic estimates and anticipated income are included with other figures in this four-page article which is notably free from promotional ballyhoo.

"A Monorail System for Los Angeles," by George W. Burpee, Cooerdale & Colpitts, New York City, CIVIL ENGINEERING, *33 W. 39th St., New York 18, N.Y., April, 1955.*

Iowa develops low-cost bituminous mix

Field tests demonstrate the practicality of 6-in. surfaces of ungraded aggregates bonded with a mortar of dust and asphalt cement. Most distinctive features are the production of suitable dust by drying and pulverizing loess and other local soils, and the coating of dust and aggregates together in a cloud of atomized asphalt in a slightly modified pug mill.

The primary problem was to use cheap local materials, not suitable as road aggregates under established methods. Engineers of the Iowa Highway Research Board reasoned that if a method of mixing could be found in which mineral dust and asphaltic binder could be formed into a stable and durable mortar, then a mortar theory of design could be applied to bond the ungraded aggregates into a serviceable pavement. Such a mortar would require that each dust particle be coated with its own individual film of binder. This was accomplished in the laboratory by an atomizing process.

Both limestone dust and fly ash were found to work well. More interestingly, dried and pulverized natural soils (producible for about 75 cents per ton) also proved satisfactory. All these dusts produced mortars having a Hubbard-Field stability sufficient for use in light traffic pavements. All behaved satisfactorily in freezing and thawing tests.

Six sands and several crusher products were tested as aggregates. Finest was a "blow sand" passing a 40-mesh screen but retained on 80; the coarsest, a crushed limestone ranging from ¼-in. down to about 20% passing 200-mesh. Though varying somewhat in quality, all appeared adequate for light traffic. A fine natural gravel also worked well. Correct filling of voids in the ungraded materials was determined by test. Generally the proportions approximated 63% ungraded sand, 30% dust, and 7% asphalt cement of 150 penetration.

The crushed limestone (¾ in. max.) yielded a mix suitable for heavily travelled roads. Next in strength were the "plaster sands" of better than average gradation.

Realizing that laboratory results, no matter how carefully attained,

HOW TO SAVE UP TO 50%

ON CRAWLER MAINTENANCE DOWN TIME

PORTABLE ADAPTABLE HYDRAULIC PULLER

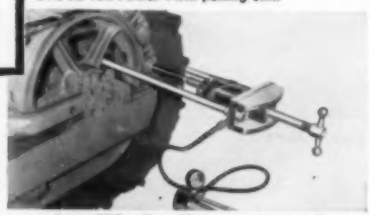
OTC

POWER-TWIN

SAVES TIME LABOR PARTS

OTC Power-Twin 50 Ton Ram

Removing crawler tractor sprocket with OTC 50 Ton Power-Twin pulling unit.



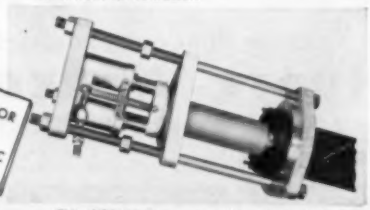
Same OTC puller with accessories removing track master pin.

OTC Puller Speeds These Jobs And Hundreds Of Others

In the shop or in the field, portable, adaptable OTC Hydraulic Pullers push, pull, spread, press, lift or straighten. Whatever your crawler maintenance problem may be there is an OTC Power-Twin team of ram and accessories to do the job faster, safer without damage to parts. You will save 50 per cent or more on Down Time.

Sharpen your bid pencil with confidence and shave your quotations down to the competitive bone with OTC Power-Twin pulling equipment in firm control of that unpredictable Down Time variable. Count on OTC performance to make you more money —get you more jobs. Illustrated here are only a few of the every day jobs that are done quickly and easily with these practical pulling tools. Write for free hydraulic bulletin.

OTC 100 Ton hydraulic unit removing pivot shaft from TD-18 tractor.



This OTC 50 Ton unit is the only tool that can remove and install International TD-24 Track and Accumulator Springs in the field.

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OWATONNA TOOL COMPANY

435 CEDAR STREET ... OWATONNA, MINN.

... for more details circle 251, page 16

puts freeways on substantial footing

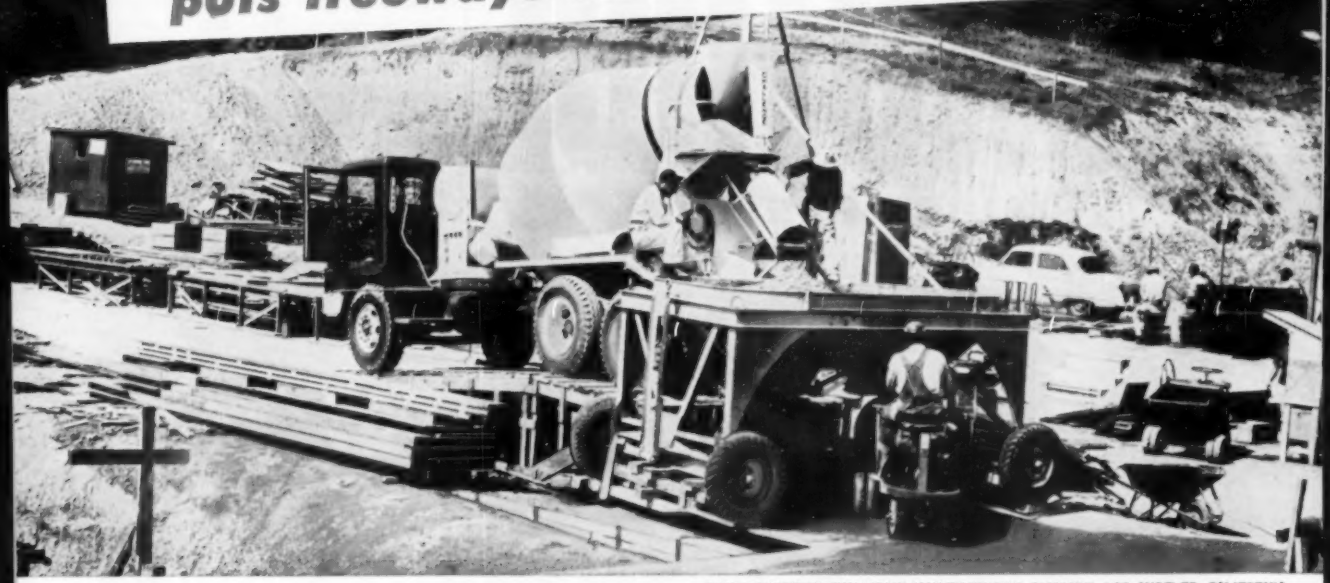


PHOTO COURTESY CHALLENGE MANUFACTURING COMPANY, LOS ANGELES, CALIFORNIA

Chrysler Compact Power and drive package ideal for sidemounting on transit mixer

Working hard to keep pace with its growing population, the State of California is underway with a substantial highway program. Great limited-access arteries are already carrying millions of vehicles past populous points and more "freeways" are in the making.

Here pictured in construction is an overpass on one section of the Southern California Freeway. A Challenge Transit Mix Pacemaker is pouring concrete into a collecting hopper. The hopper in turn will empty the mix into a power buggy which will carry it to the forms.

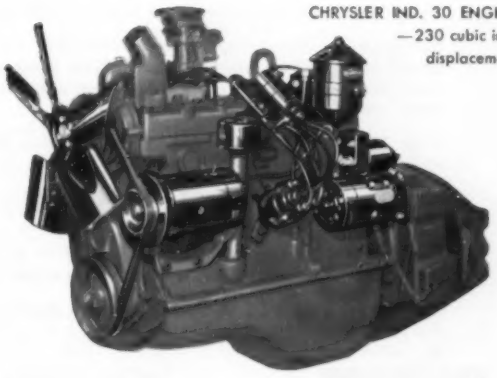
Probably neither the operator nor the contractor has given the ramp the truck is backed up onto a second thought —nor should they. Twelve-degree inclines are not unusual for modern-day transit mixers. Mixer manufacturers build and power their units to give maximum performance under every conceivable condition. That's why Challenge Manufacturing Company powers the bulk of its highly-regarded transit mixers with Chrysler Industrial Engines. Then too because of their light weight, compact construction, Chrysler Industrial Engines are "made to order" for Challenge sidemount construction. Engine, drive and transmission are on the side of the truck bed alongside the drum.

The 6½ cubic yard capacity mixer pictured uses the 230 cubic inch displacement Chrysler Ind. 30 Engine equipped with Chrysler gyrol Fluid Coupling. This "package" is a standard feature of Challenge Mixers. The result is a power-packed combination with built-in protection against the wear and tear of daily use and possible inexpert operation.

Important manufacturers of construction equipment have found it good business to offer their customers dependable equipment, dependably powered. For most of them that means Chrysler Industrial Power. They have found, as you will too, that Chrysler production-line methods adapted to specialized industrial engine building provide custom-built engines at mass-production prices.

See a Chrysler Industrial Engine Dealer or write:

Dept. 1210, Industrial Engine Division, Chrysler Corp., Trenton, Mich.

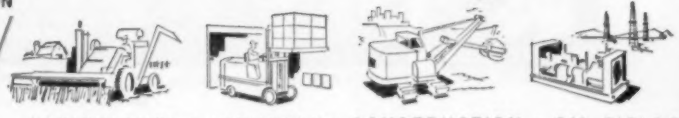


CHRYSLER IND. 30 ENGINE —230 cubic inch displacement

CHRYSLER *Industrial Engines*

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE



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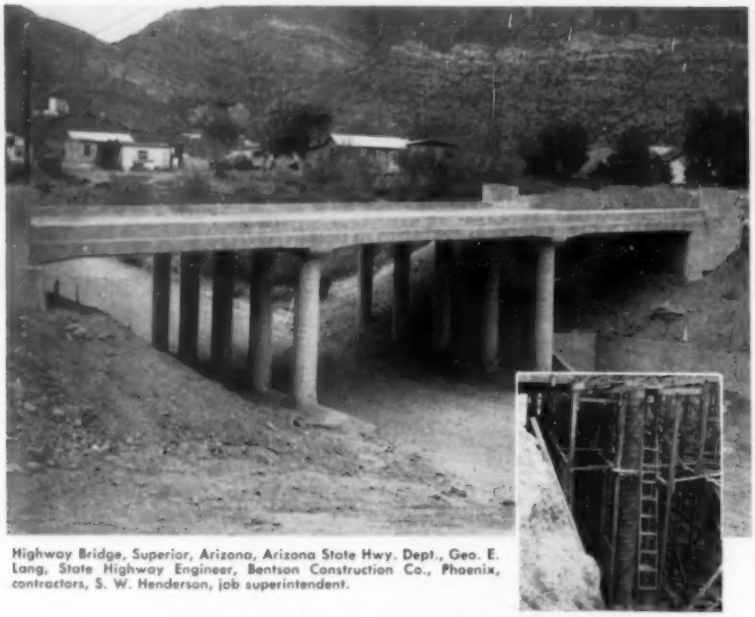
. . . for more details circle 191, page 16

SONOTUBE®

FIBRE FORMS

for round columns of concrete



Highway Bridge, Superior, Arizona, Arizona State Hwy. Dept., Geo. E. Lang, State Highway Engineer, Bentson Construction Co., Phoenix, contractors, S. W. Henderson, job superintendent.

Labor-saving columns for bridge piers!

. . . low cost SONOTUBES® make it possible

SONOTUBES were used to form the round concrete pier columns for the Arizona State Highway Department bridge at Superior, Arizona.

Quick-time and material-saving erection was only one of the many advantages gained by the use of these fibre forms. Form oiling was completely eliminated; forms were easier to strip and the resulting concrete surface was smooth and dense and no hand rubbing was required.

These 24' SONOTUBES, 24" I. D., were poured in one rapid, practically continuous, operation.

Save time, money and labor . . . use SONOTUBE Fibre Forms to erect round columns of concrete!

Available in 26 sizes from 2" to 36" I. D. up to 50' long. Can be ordered in specified lengths or sawed to your requirements on the job.

Use Sonoco's patented "A-Coated" Sonotubes for finished columns; wax coated also available.

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. . . for more details circle 235, page 16

should be proved in service, the Engineering Experiment Station of Iowa State College laid two sections of test pavement. The first, carrying about 100 vehicles per day, has performed with excellent results for two years. The second, after a 9-months trial under 2500 daily vehicle traffic, is likewise satisfactory.

With ungraded sands available at 50 cents per ton, mineral dust at 75 cents, and with ordinary construction and transportation costs, it is estimated that one mile of road with 24-ft. pavement 6 in. thick can be made at from $12,000 to $15,000.

"Ungraded Local Aggregates in Bituminous Paving Mixes" by Ladis H. Csanyi, Professor in Charge Bituminous Research Laboratory, Iowa State College, RURAL ROADS, *July-August, 1955.*

A bit of practical psychology

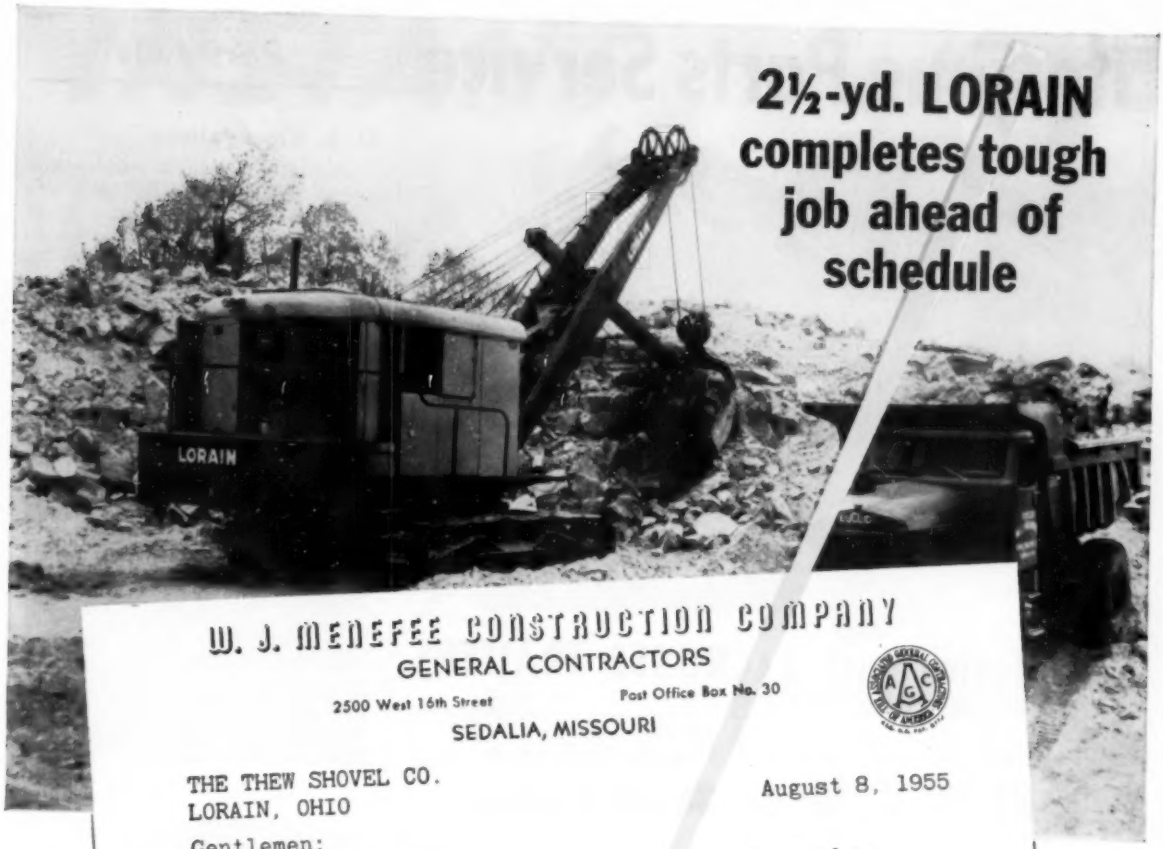
A psychological researcher, studying why employees quit jobs found that "Of every 500 who quit, 189 said the pay was unsatisfactory, 81 cited transportation difficulties in getting to and fro, 73 didn't think the chances of bettering themselves were adequate, 69 didn't like the working conditions, 64 said their health was poor and 24 gave other reasons.

"Actually, the psychologist, Dr. Willard A. Kerr of the faculty of the Illinois Institute of Technology, believes that many workers are mentally confused and don't know exactly why they quit . . ." Some become emotionally upset and build up false cases in their minds.

"To illustrate: Workers who have undependable transportation facilities or who live far from their jobs may be late with considerable frequency. The supervisor, lacking knowledge of the cause of the tardiness, may catalogue such an employee as unreliable. The worker gradually senses this distrust and develops, in turn, a feeling of resentment and a lack of confidence in management. Then he quits because 'he doesn't like the working conditions'."

"Doctor Kerr says it costs industry from $80 to $600 every time an employee leaves, and there is, consequently, a sound monetary reason for endeavoring to reduce the number of departures. . . . Determining and removing the underlying causes can both reduce the turnover and improve the morale, efficiency and company loyalty of the employees that stay."

Editorial, COMPRESSED AIR MAGAZINE, *942 Memorial Parkway, Phillipsburg, N.J., July, 1955.*



2½-yd. LORAIN completes tough job ahead of schedule

W. J. MENEFEE CONSTRUCTION COMPANY
GENERAL CONTRACTORS
2500 West 16th Street — Post Office Box No. 30
SEDALIA, MISSOURI

THE THEW SHOVEL CO.
LORAIN, OHIO

August 8, 1955

Gentlemen:

Our new 2-1/2-yard Lorain, model 85 shovel, used on our Highway 66 project in Franklin County, Missouri, is our 9th Lorain machine.

It, like our other Lorain machines, has been satisfactory to us, and its high production, ease of operation and low maintenance enabled us to complete a tough job ahead of schedule.

We feel the Torque Converter is a definite asset to the machine's operation in hard rock production.

If we were in need of additional shovel equipment, we would buy another Lorain.

Yours very truly,

E. W. Menefee, President

HERE ARE THE FACTS ABOUT THE MENEFEE JOB

240 yards of rock per hour — for a total of 170,000 yards of rock . . . that's the story of this 2½-yd. Lorain working on the 630,000-yd. contract on U. S. Highway 66, recently completed by W. J. Menefee Construction Co.

THE THEW SHOVEL CO., LORAIN, OHIO

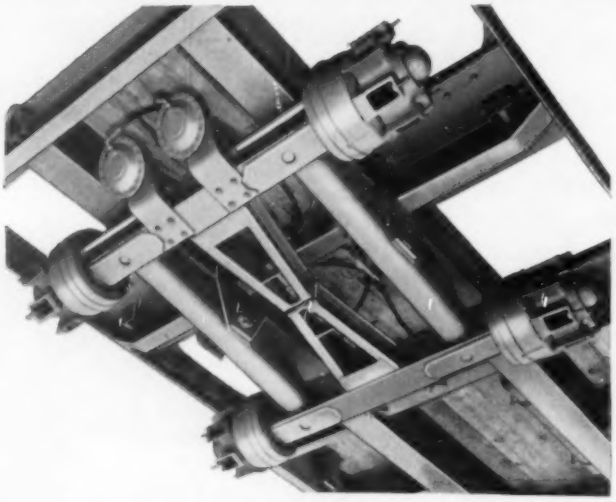
New Catalog on the Lorain "85"

There's a new catalog available on this new, big Lorain that gives you the inside story of its design and performance features. Get your free copy from your Thew-Lorain Distributor or write direct to . . .

THEW LORAIN®

. . . for more details circle 240, page 16

Life-time Parts Service



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To insure quick service on emergency repairs, every working part used in LaCrosse trailers is job-numbered for your protection. From this indexed record, any part for any trailer we have built during the past 23 years, can be supplied on short notice. You get one day service on current parts . . . one week to ten days for parts for non-current models. This fast life-time parts service, combined with LaCrosse's superior "engineered quality", means extra years of low-cost trailer performance. See your LaCrosse distributor for latest facts on dependable LaCrosse low-beds — from 6 to 75-ton capacity — with flat, drop or tilting platforms.

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- **Special heat-treated steels** for extra strength, minimum weight.
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- **Specially engineered** H-Beam axles, boxed to withstand brake torque.
- **Axles cambered 1/8"** to reduce tire wear.
- **Bigger S-Cam brakes** for faster, safer stops with reduced lining wear.
- **All parts shot-blasted** to remove mill scale, rust and weld slag.

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LaCROSSE LC-35
AMERICA'S FAVORITE LOW BED TRAILER

. . . for more details circle 255, page 16

Personals

O. L. Kipp retires

O. L. Kipp, assistant commissioner and chief engineer of the Minnesota department of highways, has retired after 39 years with the department. Known as "Mr. Minnesota Highways," he is an acknowledged leader in several fields of highway engineering. He had served in his recent top post since 1943, after rising through various sections and positions in the organization.

O. L. Kipp

Mr. Kipp served as chairman of the AASHO Committee on road design (1927 to 1944); special Committee on planning and design policies (1937 to date); and several other committees for short periods. In the Mississippi Valley Conference of State Officials, he was secretary (1948) and president (1949). And Mr. Kipp is also an enthusiastic leader in the Mississippi River Parkway Commission.

In the Highway Board he has served on the subcommittee on location, alignment and gradient; project committee on pavement joints; committee on parking; committee on rigid pavement design (chairman since 1948); member of committee on highway costs (1946 to date); design committee (1932 to date); award committee (1947); advisory committee on correlation service (1953); executive committee (1954); and on many other special assignments.

He has also been active in the American Road Builders Association, in the committees on alignment, grade and right-of-way; spreading and finishing pavement surfaces; cross-section and roadside development. With the American Public Works Association, he was on the committee for street and highway traffic, and was presented with the APWA service award in 1950.

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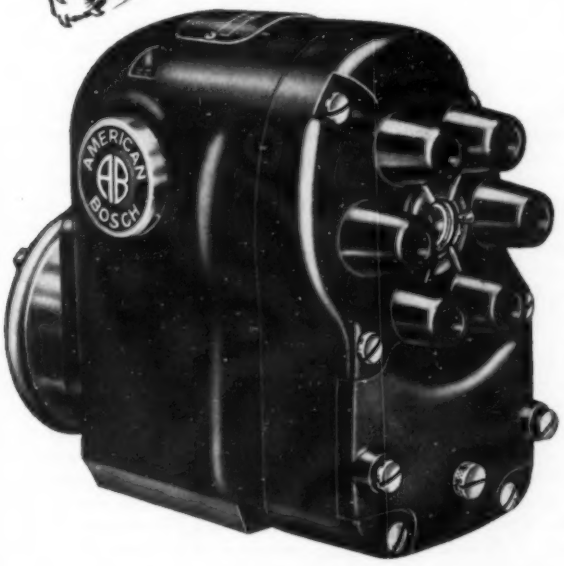
for dependable ignition

AMERICAN BOSCH MAGNETOS

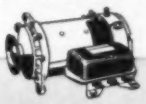


Better to start with — best in the long run. That's the power-packed story of American Bosch Magnetos . . . today's finest ignition units. Many advanced features give them greater power for split-second starting and premium engine performance PLUS built-in stamina that assures years of constant, trouble-free service in construction equipment. That's why they're so widely used as original equipment by many leading engine builders.

For your every replacement need—from the largest, heavy duty engines with either high or low tension ignition, down to today's compact, high-speed power units — there's an American Bosch Magneto precisely engineered for maximum efficiency at all operating speeds and loads. Moreover, American Bosch gives you all the advantages of one of the world's largest and most efficient Magneto Service organizations through your nearby AB Service Agency. Write today for application data on your high or low tension ignition engines. American Bosch, Springfield 7, Mass. A Division of American Bosch Arma Corporation.

AMERICAN BOSCH

Automotive and Aviation Magnetos

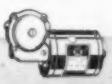


Generators and Regulators

Components for Aircraft Engines

AMERICAN AB BOSCH

Small Electric Motors



Electric Windshield Wipers

Diesel Fuel Injection Equipment

. . . for more details circle 180, page 16

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equals
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WITH Cataflex Reflective Coating Kits you can SAVE UP TO 90% on your sign reflectorizing costs in your own sign shop—no special equipment needed—no special training required. Your material costs with Cataflex can be AS LOW AS 10 CENTS PER SQ. FT.

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Colors available—red, yellow and white opaque and clear-transparent. Specify drying method used when ordering, bake or air dry. Four kit sizes: Introductory—50 sq. ft.; Standard—600 sq. ft.; Economy—3,000 sq. ft.; and Super 6,000 sq. ft. Complete instructions with each Kit.

Cataphote CORPORATION
Toledo 10, Ohio and Jackson, Miss.

. . . for more details circle 248, page 16

(Continued from page 66)

vaged from the next upstream bridge, one that had been built during the war when steel was scarce. This structure, near the wreckage of the old 90-ft. bridge, went into place in five days. A Northwest 1½-yd. was used for pile driving, a Northwest ¾-yd. for clean-up and placing beams, and a Caterpillar D8 to cut the new approaches.

The H. W. Riebe Co. was asked to demolish the next two bridges upstream, both on U. S. 611. Traffic is being detoured around both on an old route and the department is undecided whether to put temporary structures or permanent bridges here.

A few miles north, G. H. Litts has used a Bay City ¾-yd., an International TD9, and a D7 to change the stream bed and to clear around the old concrete arch bridge that had collapsed.

Three other bridges are being replaced by J. Robert Bazley. In three days the contractor has cleared the stream at one site and fabricated four 40-ft. metal arch pipes — two of them 8x10 ft. and two 6x10 ft.

On another location, the Bazley men repaired damage to another arch by installing new pipe 123″x7″x40′ long. A 20-ton P&H truck crane handled the sections.

A half-mile away, the contractor completed a run-around and metal arch bridge to replace a demolished structure. Huge chunks of concrete pavement from the old bridge lay askew along the channel where fast waters had lifted them. The new temporary crossing is also of 120-in. corrugated metal pipe, 40 ft. long, covered with earth and surfaced with shale. A Lorain 1¾-yd. was used to break up the old bridge and an Allis-Chalmers HD15 to work in the streambed and cut new approaches.

All along Route 611 and other main lines, as well as on connecting county roads, other contractors and highway personnel were similarly engaged. By working 12-hour days, they have accomplished much within the first 10 days after the flood.

In the state capital at Harrisburg, plans are being formulated for Stage Two — the permanent reconstruction job — and means to finance it. The legislature has already authorized a highway disaster advisory committee and boosted the gasoline tax one cent to pay for repairing the roads and bridges. The revenue increase is expected to yield $45 million, of which $30 million will go for state roads and bridges and $15 million for local streets and bridges.

The job is expected to take two or three years at a more normal pace. It will be a few months yet before work goes back to normal in Monroe County. Roadbuilders there say they have all the excitement they need for a long time.

Minnesota tests natural rubber asphalt mixture

In a comprehensive in-use test designed to determine the advantages of rubber asphalt surfacing, the Minnesota state highway department recently put down a variety of rubber asphalt mixtures over 12 miles of highway on Route 152 near Monticello, Minnesota.

One control section using RC5 in its natural state, and three rubberized sections using RC5 in conjunction with various rubber additives, were laid.

The natural rubber section, about 3 miles in length, consisted of an RC5 base asphaltic stock (85-100 pen.), 10% cutter and 2% natural rubber powder dissolved in the asphalt cement prior to use of the cutter.

While the viscosity of the RC5-natural rubber combination was slightly lower than that without rubber, the temperature used in laying both the non-rubber control and the natural rubber section was 275° F.

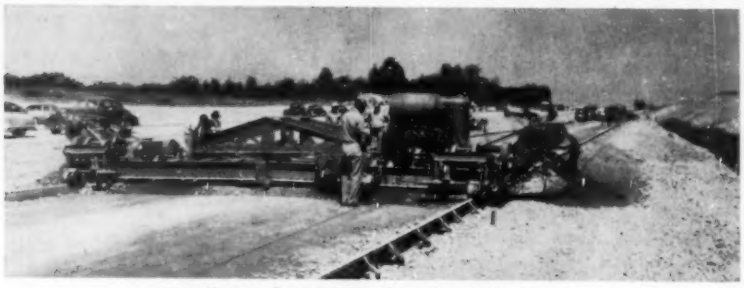
Use of the natural rubber occasioned no changes in the construction procedure, other than the blending of the rubber powder with the RC5 materials at the St. Paul Park refinery of the Northwestern Refining Company. The rubber and asphalt blended easily, and transportation from refinery to job site, and transportation from truck to distributor for application were routine operations.

During the laying itself, the asphalt-rubberized mix flowed freely, with no clogging of nozzle or spreader bars. Due to rain just before the laying of the natural rubber strip, the chips were wet when placed. Despite this, whip-off was negligible. Actually, it was less apparent than during the laying of the non-rubber control section, which went down dry. This would seem to indicate that adding natural rubber tends to prevent whip-off even under unfavorable conditions.

Minnesota is considered an excellent testing ground for the weathering attributes of the natural rubber asphalt combination. Weather extremes experienced there should give good indications of rubber's ability to help counteract the effect of cold weather cracking and hot weather bleeding.

What's New
in Equipment and Materials

Reader Service Coupon on Page 16, more items pages 123-127



Finegrader With Grade-A-Curve Feature

Finegraders Have New "Grade-A-Curve" Features

Gar Wood-Buckeye power finegraders with a new "Grade-A-Curve" feature, claimed to make the fine grading of highway curve transitions an easy, continuous operation, with grade to exact specifications, have been announced by Gar Wood Industries, Inc., Wayne, Mich.

It is stated that this new unit cuts grade so accurately that concrete savings on the transitions of only one curve have amounted to $1500 for a 24-ft. wide pavement.

Finegraders with the Grade-A-Curve feature have an I-beam structural frame which is hinged at the center of the machine, so that an accurate, ratchet-type control adjustment with graduate steps raises the frame and cutting blades at the center for cutting a crown, and lowers them to cut on the level without stopping the machine for adjustments.

For more information circle 106 on Service Coupon Page 16 and mail now.

Spreader Box Converted to Portable Unit

Demountable wheels attached to an axle mounted transversely to working position has converted the Pettibone Wood spreader box into a portable unit. An elevated detachable draw bar permits towing the unit from job to job. The spreader box which is towed behind a dump truck forms materials into accurately measured windrows. Complete specifications and prices may be had by writing to Pettibone Wood Mfg. Co., Box 620, 6900 Tujunga Ave., North Hollywood, Calif.

Pettibone Wood Spreader Box

For more information circle 107 on Service Coupon Page 16 and mail now.

down by the seashore
TATEM Surf Club
Carefree living enhanced by . . . large, cheerful guest rooms . . . private pool, ocean beach, cabana club . . . dining room and cocktail lounge.
Rates from $8 double, European Plan.
SELECTED CLIENTELE
Write for Booklet
On the Ocean at 43rd Street MIAMI BEACH

KOHLER ENGINES
4-CYCLE • AIR-COOLED
A Quality Engine for Quality Equipment
Short Stroke
• Less Friction and Wear
• More Power
• Longer Life
Easy Starting
K90. . . 2.5 to 3.6 H.P.
K160. . 3.6 to 6.6 H.P.
K330. . . 7 to 11.8 H.P.
K660. . . 12 to 26 H.P.
K160 6.6 H.P. Full Power
KOHLER CO.
Kohler, Wisconsin
Established 1873
KOHLER OF KOHLER
PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS
. . . for more details circle 218, page 16

40-Ton, Two-Axle Truck

A new 40-ton, spring-mounted dump truck, the Kenworth 803, now in production by Kenworth Motor Truck Corp., Seattle, Wash., is engineered for the big off-highway hauling jobs in earth and rock moving and in open pit mining.

Kenworth 803 Truck

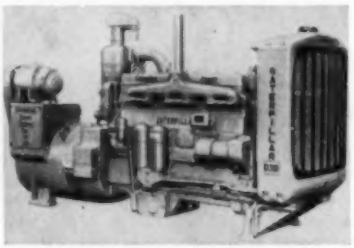
The first three Kenworth 803 units have been delivered to Kaiser Steel Corp., and will be used at Kaiser's Eagle Mountain Mine near Indio in Southern California to haul iron ore. Body capacity struck is 24 cu. yds. Heaped load (2 to 1) is 28 cu. yds. With a gross vehicle weight rating of 150,000 lb., the chassis weight of the Kenworth 803 with body is 68,000 lb. The vehicle measures 12 ft. across the front hubs, and is 14 ft. off the ground over the one-man cab shield.

Powered by a single diesel engine, which will vary between 300 and 500 horsepower depending on the grades of the loaded haul, the Kenworth 803 is claimed to maintain all the advantages of a two-axle, single-axle drive truck — shorter turning radius, less chassis weight, economy of operation and ease of maintenance. Turning radius is 36½ ft., with a turning angle of 30 degrees.

For more information circle 108 on Service Coupon Page 16 and mail now.

Self-Regulated Diesel-Electric Set

The first of a completely new line of diesel electric sets has been announced by Caterpillar Tractor Co., Peoria, Ill. These new self-regulated sets have the desirable characteristics of externally-regulated sets and also maintain the simplicity of operation and motor starting ability of former model self-regulated units. Notable is the fact that each Cat generator is now designed and built to match the Cat engine powering which assures maximum dependability in a simple, complete package.



Caterpillar's D318 Diesel-Electric Set

The new units are designed to meet the needs of applications now served by self-regulated or externally-regulated generators. Featuring close voltage regulation, they provide steady voltage from no load to full load. During initial installation, the "terminal" voltage and voltage "droop" can be adjusted to meet the special conditions of the particular application. After that, the adjustments are locked and no further adjustments are necessary. Extremely easy installation is claimed, as no complicated switchgear or external voltage regulators are needed. The new units can be paralleled with most generators of any type or make now in use. They are smaller and more compact than previous models.

For more information circle 109 on Service Coupon Page 16 and mail now.

20,000 G P H Pump

A new model, 20M, in its line of centrifugal pumps has been announced by Rice Pump and Machine Co., Belgium, Wis. Although the new pump, as shown here, is basically designed for use with a 15 HP, twin cylinder engine, the frame size and design permits the use of a single cylinder gas engine, diesel engine or electric motor. Rubber tired wheels are 20 in. x 4 in. Steel wheels or skids may be substituted for the rubber tires to meet varying field applications. A lubricated, mechanical seal of the manufacturer's own special design affords positive, leak-proof protection between shaft

52,000 Tires Worth Of EXPERIENCE!

. . . Plus The World's Finest Retreading Facilities

Superior equipment, including the world's largest and finest three-sectional retreading mold, enables Southern Tire Company to retread any tire, regardless of growth, without buffing to the breaker strips or damaging the carcass of the tire in any way!

This, plus Southern Tire's long experience and use of the finest rubber made, assures GUARANTEED NEW TIRE MILEAGE AT HALF THE COST!

CHOICE OF ROCK SERVICE, TRACTION TYPES, OR RIB TREADS TO SUIT YOUR PARTICULAR JOB.
All Sizes from 1100x24 to 2700x33.
Also new sizes 29.5x25 and 29.5x29.

NO EQUIPMENT DOWNTIME

Southern Tire's pick up and delivery service—at your job site after work hours—assures no equipment downtime.

Call Your Favorite Dealer and Specify Southern Tire Retreads.

NATIONAL TIRE DEALERS ASSOCIATION

AMERICAN ROAD BUILDERS' ASSN. 1902

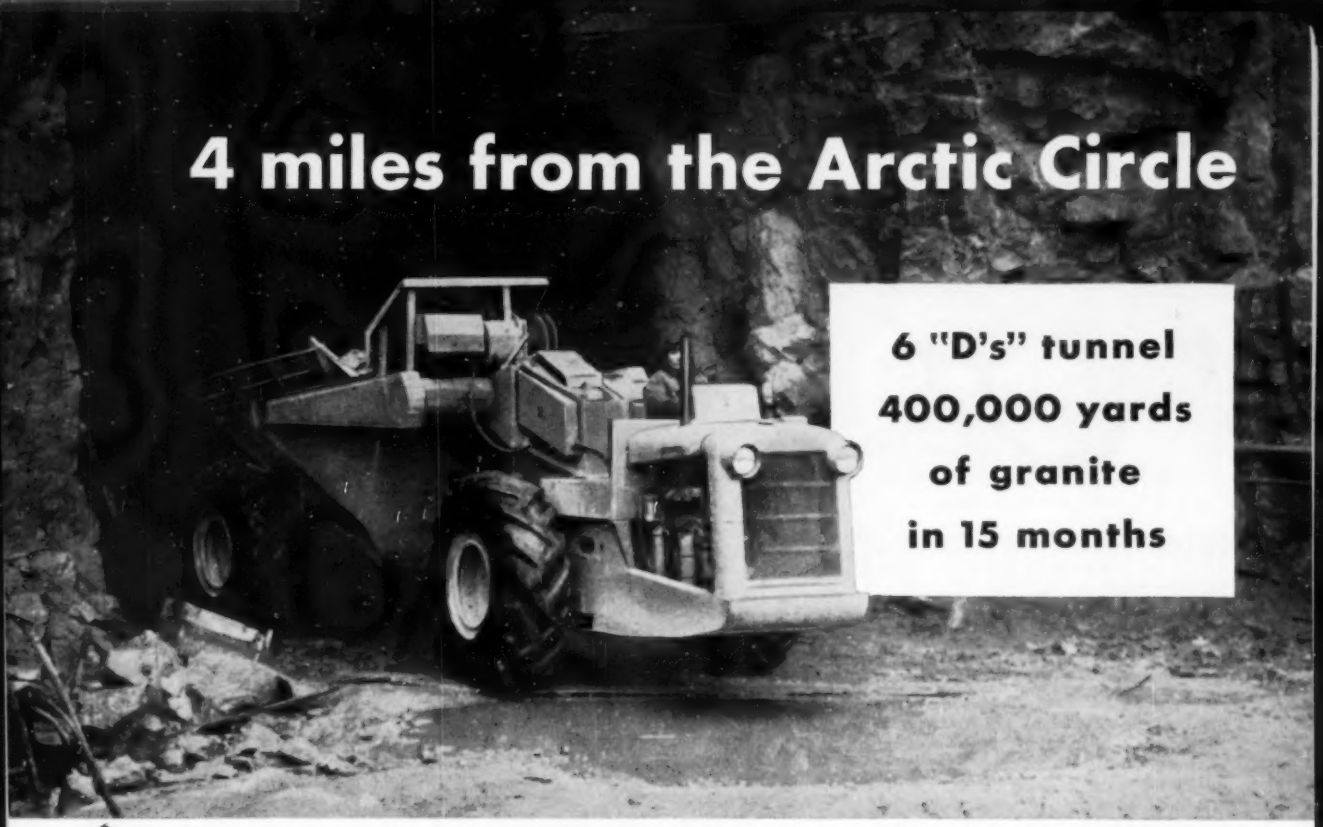
SOUTHERN TIRE COMPANY

312 - 316 S. COURT STREET
FLORENCE, ALA.

PHONE COLLECT
Florence 85 or 86

. . . for more details circle 236, page 16

4 miles from the Arctic Circle



6 "D's" tunnel 400,000 yards of granite in 15 months

Rear-Dump Tournapull emerges from one of the 4 tunnels where blasting operations are taking place. Tunnels will total 4.3 miles in length. All are 16 ft. high, and 20 ft. wide. "D's", with their 12'4" turning radius, are ideal for work in such confined spaces.

At site of dam where units worked occasionally, 1½-yd. shovel loads Rear-Dump with 8 cubic yards of blasted granite. Big, wide top opening allows load to be made in 2 to 2½ minutes with minimum spillage.

"D" dumps load of rough, blasted granite for fill. Front-wheel drive and big air-brakes let unit back, unload safely over edge.

At Jumisko, Finland, only 4 miles south of the Arctic Circle, Pohjolan Voima Co., a prominent Scandinavian firm, worked 24 hours a day, 7 days a week, on a rock-hauling job similar to that found in many mines and quarries.

Rock-moving was continuous even in winter when temperatures dropped to 40° below zero, and snow lay 5 feet deep around the tunnels.

Severe weather for men and machines did not stop the 6 Model D Rear-Dump Tournapulls which moved all 400,000 cubic yards of granite involved in the project — digging of 4 tailrace tunnels and building a system of dams for a hydro-electric power station. All through their grueling 24-hour-a-day schedule for over a year, machines worked with virtually no downtime. Company records show the 6 units maintained 95% mechanical efficiency despite adverse conditions.

Most of the time, material was blasted to form the tunnels, shovel-loaded into the Tournapulls and hauled up 1 to 12½% grades to the fills and dams. Haul was made partly through the tunnels with loads averaging 8 cubic yards of the high void material.

Good production brings repeat orders

Output and mechanical efficiency were considered so good the contractor has added steadily to his fleet of LeTourneau-Westinghouse machines. He bought his first two 9-ton "D" Rear-Dumps in May, 1955. Two additional units were purchased in July, 1952, and two in January, 1953. Now, Pohjolan Voima Co. has one more Tournapull Rear-Dump on order.

If you must work under some of the handicaps faced by this Finnish firm, you ought to check on Rear-Dump Tournapulls. Their short turning radius speeds work in tight quarters. Their simple rugged construction eliminates many repairs. They're easy to operate and run well in extreme cold, extreme heat, or high altitudes. There's a size to fit your needs . . . 9, 22 and 35 tons. Write or call us for all the details. There's no obligation.

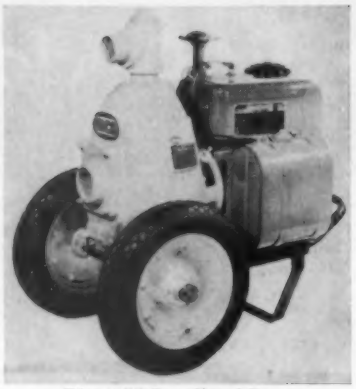
Tournapull—Trademark Reg. U.S. Pat. Off. R-458-D-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 252, page 16



Rice 20M Centrifugal Pump

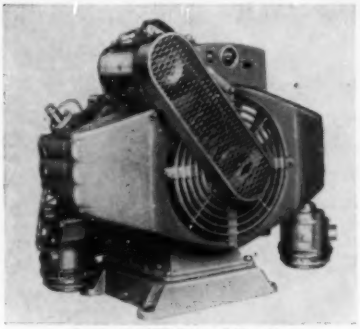
and impeller plate. The seal is spring loaded to compensate for wear. Pump pressures range up to 60 lb.

For more information circle 110 on Service Coupon Page 16 and mail now.

15 HP Diesel Engine

A new 15 HP air-cooled diesel engine has been announced by D. W. Onan & Sons, Inc., University Ave., S.E. at 25th, Minneapolis 14, Minn. This heavy-duty, full-diesel engine is being offered for the first time as a separate item. Formerly, this engine was manufactured exclusively as the prime mover for the company's 5,000-watt diesel electric generating plant, Model 5DRP.

The DRP engine is a 4-cycle, air-cooled, solid injection full-diesel engine. It is performance rated at 15.0 HP (corrected BHP with accessories) at 2300 RPM. The opposed two-cylinder design of the engine is claimed to provide exceptionally smooth running operation and the air-cooling eliminates the necessity to maintain radiator, fan belt, etc. as on water-cooled units. The engine has a 3½ in. bore, 3½ in. stroke and a 67.3 cu. in. piston displacement. Compression ratio is 17.3:1 and the unit weighs 516 lb. The crankshaft and connecting rods are of forged steel, with extra large bearing surfaces. Pistons are of vanasil aluminum alloy and the exhaust valves and seats are of Stellite. The unit has full-pressure lubrication.



Onan 15 HP Diesel Engine

For more information circle 111 on Service Coupon Page 16 and mail now.

Portable Heater Operates at 12 ct. Per Hour

A new Master B-100 portable heater announced by Master Vibrator Co., 1752 Stanley Ave., Dayton 1, Ohio, weighs 78 lb. on wheels and can be lifted or wheeled easily by one man. The heater is said to operate at 12 ct. per hour.

Master B-100 Portable Heater

The B-100 has a 100,000 BTU per hour capacity, with ¼ HP combined fan and pump motor that blows 500 cu. ft. of warm air per minute. And the heating power is sustained. It has a 12-hour fuel capacity to run all night — safely — due to the stainless steel combustion chamber. Runs from regular 110-115 volt, 60 cycle AC current and burns kerosene or No. 1 or No. 2 fuel oil. Easy to operate, the automatic ignition turns on with the flip of a switch.

For more information circle 112 on Service Coupon Page 16 and mail now.

Owners report the new Frink One-Way Taper Blade Sno-Plow used again in last winter's severest storms proved itself to be the most rugged and efficient one-way ever made. Operators particularly praised the throwing and spreading qualities of the Frink because it does not form high side banks that encourage drifting.

The increased taper and moldboard curvature permit higher speeds because of the increased visability and ease of handling.

Frink One-Way Sno-Plows are available in 3 sizes and are interchangeable with the Frink V-Type, Reversible Type, or Roll-Over Type Sno-Plows and the Frink Roto-Broom.

FRINK SNO-PLOWS

For further information on this Sno-Plow write for catalog to Clayton, N. Y., Box RS-5510

FRINK SNO-PLOWS, INC., CLAYTON, NEW YORK

Made in Canada by

FRINK SNO-PLOWS of CANADA, LTD., TORONTO, ONT.

. . . for more details circle 202, page 16

Springs and sugar sand can't stop them!

3 Tournapulls deliver 55 to 69 loads hourly over hilly 1500′ cycles

Building this bridge approach near Hart, Michigan, presented Contractor Lavern Rice with some extremely tough loading conditions.

Most of the 102,000 yards involved was abrasive sugar sand. The rest was sticky blue and red clay. Virtually every cut uncovered a flowing underground spring. "It made for the roughest job I'd seen in 25 years," said Operator Ernest Harris.

To handle all earthmoving, 3 D Tournapulls and 1 rubber-tired Tournatractor were driven from the company office in Hartford, Mich. In 6 hours, the Tournapulls had traveled the 120 miles and were moving dirt.

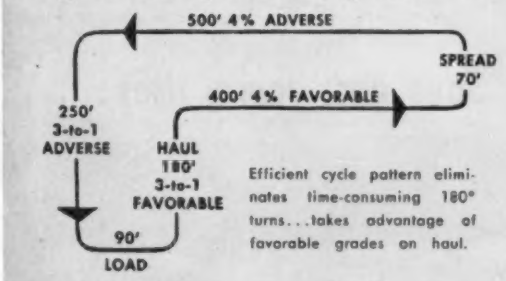
About 95% of the time, the "D's" were push-loaded by the 186 hp Tournatractor or a 102 hp crawler. In sand, loads of 6.3 pay yards took an average of only 25 seconds. In clay, load time for 5 pay yards averaged 20 seconds. Time studies on one 1500′ cycle show each "D" delivered 23 loads per 50-minute hour. Over the whole job, Mr. Rice states each "D" averaged between 18 and 19 loads per hour on the same length haul.

This push-loading production was nearly matched on the other 5% of the job, where the 9-ton Tournapulls were loaded by clamshell with very wet material. "I really like this LeTourneau-Westinghouse equipment," says Mr. Rice. "We couldn't have accomplished the majority of this project without it."

Tournapull, Tournatractor—Trademark Reg. U.S. Pat. Off. TDP-587-H-bw

Tournatractor's and Tournapull's ability to work under any kind of conditions can pay off for you, too. Ask us for owner-verified performance reports on work like yours. Then ask for a demonstration of Tournatractor or Tournapull on your job. There's no obligation.

Typical 1500′ cycle worked by Rice's "D's"



Efficient cycle pattern eliminates time-consuming 180° turns...takes advantage of favorable grades on haul.

With Tournatractor pushing, "D" picks up load in 90 feet. Cuts average 27′ in depth and usually include horizontal layers of various types of sand as well as blue and red clay.

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Vibratory Earth Borer

A newly engineered underwalk and driveway borer announced by Mall Tool Co., 7725 South Chicago Ave., Chicago 19, Ill. is claimed to bore holes four to

Model 14GVEB Power Borer

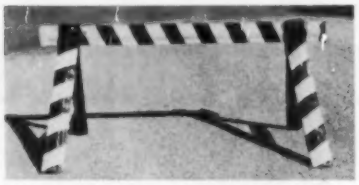
ten times faster than by old fashion methods of using pick and shovel. Without removing any soil, the Mall earth borer quickly makes a 2 in. diameter hole straight through the soil, under concrete sidewalks, and even under wide driveways. The borer head stays on a steady, level course all the way.

The Mall power borer is easy to handle and to operate. An outstanding feature is its portability provided by its rubber tire wheels, allowing the earth borer to be conveniently rolled from one place to another on its wheelbarrow mounting. One man wheels, while another carries the boring head and flexible shaft.

For more information circle 113 on Service Coupon Page 16 and mail now.

Flexible Street Barricade

Rubber construction makes the barricade here pictured bounce away when struck, or flatten out when run over, without damage or danger from splintering, and with a resulting long service life. Design is the typical saw-horse, with 8 ft. center bar clamping securely into the nich where the legs are fastened, to permit easy transport and quick set-up.



Rubber Safety Barricade

Bar and legs are made of parallel strips of used tire fabric which are stapled to strips of 28-gauge galvanized steel sandwiched in between a metal stitcher made by Bostitch of Westerly, R.I. being used for this purpose. The bar is strengthened with spring-steel wires which leave it flexible. Painting is in colors meeting various state highway requirements, either with or without reflectorizing.

Rubber Barricade Co., Larned, Kansas, is the manufacturer.

For more information circle 114 on Service Coupon Page 16 and mail now.

Electric Generator Attachment For I H Trucks

The "Electrall" portable electric generator, developed by International Harvester Co. and General Electric Co. as an attachment for International trucks, provides on-the-spot standard 60-cycle power for operating power tools in pioneering, building and construction work, public utility and municipal operations, fire, flood and rescue activities, petroleum production, mining, on the farm and other fields.

Output of the "Electrall," which is operated by power takeoff from the truck's engine, is 12,500 watts. It will handle up to a 10-HP motor, depending on its applications, and has plug-in outlets for alternating current 110 or 220 volt single phase, or 220 volt 3-phase.

Weight of the "Electrall" is 325 lb. It occupies an area 22 in. long, 20 in. wide and 20 in. high. It can be readily removed from the truck when its use is not required. The "Electrall" also can be mounted on various International Harvester tractors to furnish power for numerous farm applications.

"Electrall" Electric Generator on IH Truck

For more information circle 115 on Service Coupon Page 16 and mail now.

Masonry Cutting Blades

A new small size "Valsafe" blade, quickly and easily adapted for use on any make portable electric and table saws, has been announced by Victor Engineering Corp., 15 Maple Ave., Paoli, Pa. New design and development using several layers of fibreglass and abrasive are stated to have produced an extremely strong, break-resistant, versatile blade of long life, suitable for cutting miscellaneous metal and ceramic products, transite, gypsum board and tuck pointing. A fibre bushing inserted into the metal arbor of the blade, in a matter of seconds, adapts this new Valsafe blade for use on table saw. Adaptor bushings and Valsafe blades, in 6 in. and larger sizes, are available.

For more information circle 116 on Service Coupon Page 16 and mail now.

Save gas, gears, tires.....

GET MAXIMUM USE FROM YOUR 4-WHEEL DRIVE!

Jeep

WARN *Automatic* HUBS MAKE 2 TRUCKS OUT OF 1

Road or no road, Warn *Automatics* give your 4-wheel drive sensational new economy, driving ease and mobility. Your 4 W. D. is automatically a "free-wheeling" 2-wheel drive, or 4-wheel drive AS YOU SHIFT! Use it as a town car, "pick-up" or work horse in and out of mud, sand; on and off the highway. It "free-wheels" or "4-wheels" to suit conditions AS YOU SHIFT! What's more, you can drive at *high speed* in 4-wheel drive on any terrain! Automatic (and Locking) models for *all* makes of 4 W. Ds. from ½ to 1½ tons. Ask your *authorized* factory truck dealer for a FREE DEMONSTRATION of amazing Warn Hubs, or write:

WARN Automatic HUBS

WARN MANUFACTURING CO., Riverton Box 6064RS10, Seattle 88, Wash.

. . . for more details circle 257, page 16

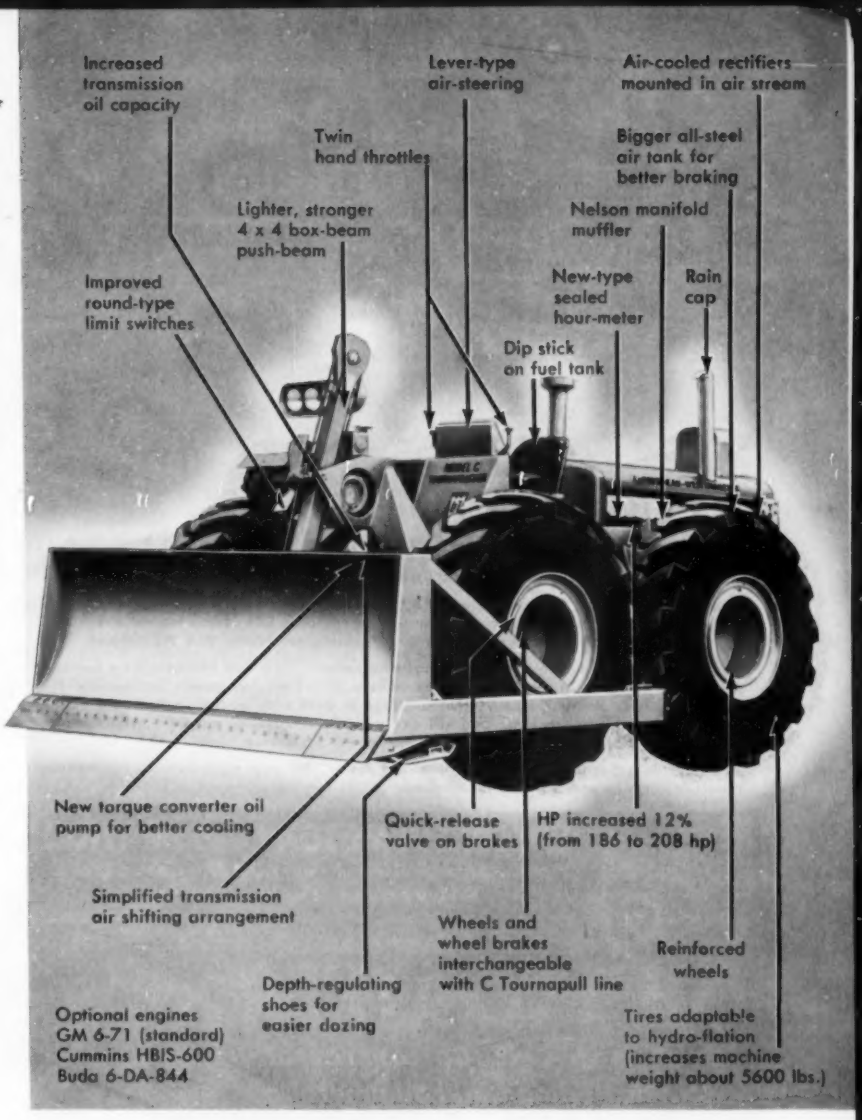
IMPORTANT CHANGES

have been made

Since the LeTourneau-Westinghouse Company was formed in 1953, many important machine improvements have been made. All these shown are standard on current-production models of the rubber-tired C Tournatractor. Study them for yourself . . . then let us show you first-hand what they can mean to you.

Ask for demonstration

Call us anytime. We'll be glad to drive a *new model* Tournatractor to your job, then work it until you're convinced. There is no obligation, no cost to you.


Increased transmission oil capacity
Lever-type air-steering
Air-cooled rectifiers mounted in air stream
Twin hand throttles
Bigger all-steel air tank for better braking
Lighter, stronger 4 x 4 box-beam push-beam
Nelson manifold muffler
Improved round-type limit switches
New-type sealed hour-meter
Rain cap
Dip stick on fuel tank
New torque converter oil pump for better cooling
Quick-release valve on brakes
HP increased 12% (from 186 to 208 hp)
Simplified transmission air shifting arrangement
Wheels and wheel brakes interchangeable with C Tournapull line
Reinforced wheels
Depth-regulating shoes for easier dozing
Optional engines GM 6-71 (standard) Cummins HBIS-600 Buda 6-DA-844
Tires adaptable to hydro-flation (increases machine weight about 5600 lbs.)

Tournatractor—Trademark Reg. U.S. Pat. Off. T-800-G-b

Breaking up rock seams, pavement, etc., Tournatractor can tackle as tough jobs as any crawler. Loading may be slower and cuts thinner on some heavy materials, but faster push and return save time. On long pushes, Tournatractor often doubles crawler output.

Tournatractor's sealed power-train takes it safely through water, mud, dust . . . prevents damage and wear to bearings and moving parts. Lubricants are not washed away nor filled with abrasives. Maintenance is lower since 4 wheels do work of 500 track parts.

Ideal for scattered jobs, Tournatractor spends minimum time in travel. Top speed is 19 mph . . . 1,670 ft. per minute. Rig goes anywhere without planking . . . travels over pavement or cross-country . . . needs no loading, no extra men or expense for trailer-haul.

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

POWER to MIX Concrete and DELIVER it...BOTH UNITS ARE WISCONSIN-POWERED

Working here are two fine units powered by Wisconsin Heavy-Duty Air-Cooled Engines . . . the "Scoot-Crete", built by Getman Brothers, Manufacturing Div., South Haven, Mich., and the Kwik-Mix Dandie, built by Kwik-Mix Co., Koehring subsidiary, Port Washington, Wis.

Heavy-duty service demands heavy-duty engine power . . . a fact recognized by builders and buyers of construction equipment everywhere. That's why Wisconsin Engines are the preferred power choice. Tapered roller bearings at both ends of the shaft taking up all thrusts, fool-proof air-cooling, and an easily-serviced OUTSIDE magneto with impulse coupling are a few of the features accounting for this preference.

You can't do better than to specify "Wisconsin Power" for your equipment . . . for dependable performance and low-cost maintenance.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

. . . for more details circle 247, page 16

COLD WEATHER
Can't stop Chicago contractor Helmar Hedman and Summeraire

300,000 BTU's PER HR. . . . . yet priced 20-30% lower than smaller heaters

Clayton
SUMMERAIRE PORTABLE, OIL FIRED SPACE HEATER for Fast, Low Cost HEATING DRYING THAWING

Helmar Hedman, like all contractors, makes money when jobs are finished on time . . . *weather or not.* Summeraire chases winter cold . . . dries out new construction; prevents freezing of concrete while curing; keeps workmen warm. Durable, portable, self contained; electric or gasoline engine drive, Summeraire delivers 2400 cu. ft. high velocity heated air per minute at amazing economy. 300,000 BTU capacity at a price 20-30% lower than that of smaller heaters.

CLAYTON MANUFACTURING CO., Box 550 El Monte, California RS-10
Without obligation, send complete details, prices and name of nearest Summeraire dealer.

NAME_____

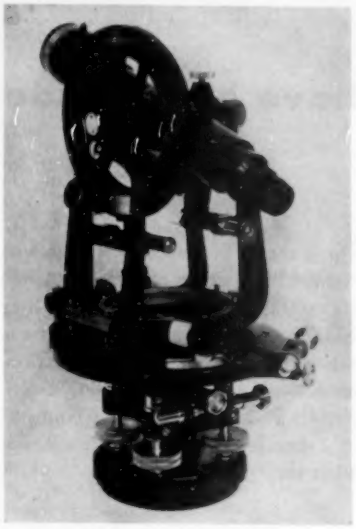
ADDRESS_____

CITY_____ STATE_____

. . . for more details circle 193, page 16

Improved Transit

A new 5¾ in. survey transit with many improvements for quicker, more precise setting is announced by Umeco Optical Division, 465 California St., San Francisco 4, Calif. Included are rifle sights that bring the telescope on the target immediately, focusing knob through telescope axis that permits easy setting regardless of telescope position, improved graduated plate and other new features.



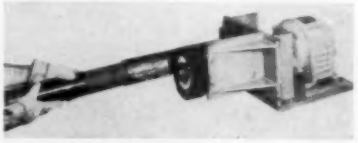
"Umeco" 5¾ in. Transit

For more information circle 117 on Service Coupon Page 16 and mail now.

Soil Sample Tube Cleaner

Soil sample tubes used in road building or otherwise can be cleaned quickly and thoroughly with a special cleaner designed and manufactured by the Machine Division of The Fuller Brush Company, Hartford 2, Conn.

This bench top machine is used to remove dirt and rust from the inside and outside of tubes or tubelike devices in a minimum of time and with a minimum of difficulty.



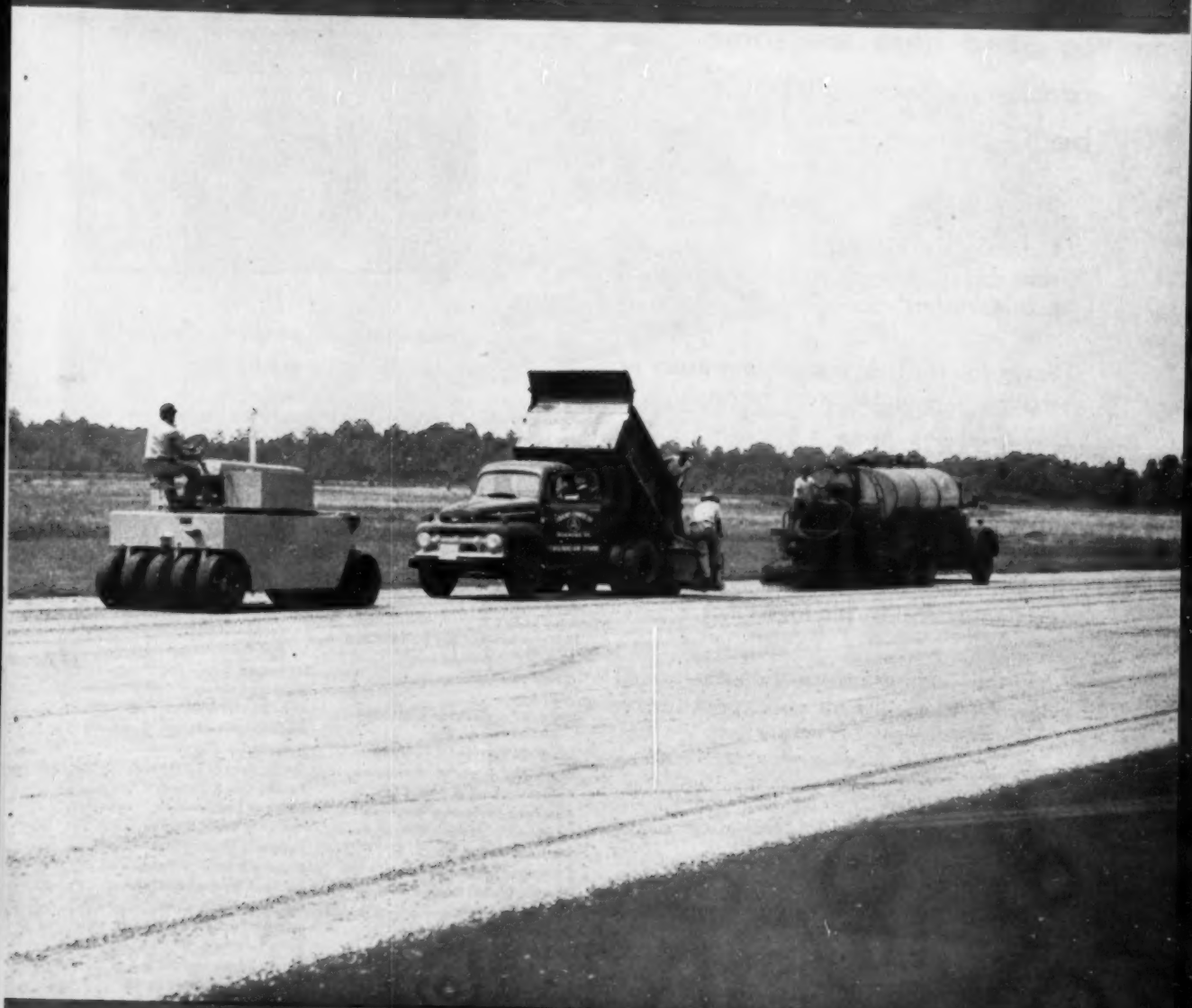
Fuller Brush Co.'s Tube Cleaner

The tube is inserted into the work support mechanism where the interior and exterior of a little more than half the tube are cleaned simultaneously as it is rotated by the operator. Then the tube is reversed and the other half is cleaned in the same manner. The machine can be modified to suit specific requirements.

For more information circle 118 on Service Coupon Page 16 and mail now.

For more ideas on Equipment and Materials . . . . see page 123

Bituminous ROADS AND STREETS



Published by Gillette Publishing Company
22 West Maple Street, Chicago 10, Illinois

Applying double seal, Richard E. Byrd municipal airport, Richmond, Virginia. (See article in this issue).

Bituminous Overlay

Small City Contracts for Street Maintenance

OCTOBER 1955

here . . . without a doubt . . . is the most useful buying catalog in your office

. . . and here are some reasons why you should be USING IT DAILY!

- Catalogs are PREFILED — saving you time and space required to file individual manufacturers' catalogs.
- Saves you the time and inconvenience of writing to manufacturers for catalogs.
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MADSEN Dryers are equipped with four single-flanged trunnions which are furnished in work hardening cast steel. The trunnion faces are turned to true diameters assuring smooth rolling of the dryer shell.

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Often Copied but Never Matched

Leaders for many years, McConnaughay Asphalt Mixers have many outstanding features which are often copied..."but the complete machine has never been matched for versatility and all-around performance," said a long-time user. No other mixers can do so many things so well. Details and specifications (available on request) will show you why.

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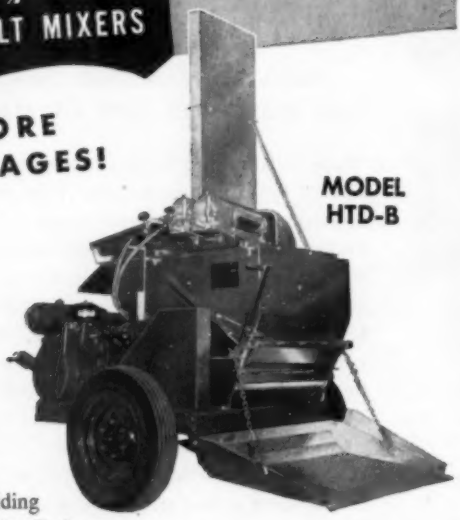

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VIEWS AND

The Age

A PHILOSOPHER might contemplate that the last fifty years were essentially the age of materials development, while the age we are entering might be described as the age of material enhancement by additives. Undoubtedly new basic materials, with different or better utilization than our present ones, will continue to be developed. However, much of the work done will apparently be to produce highly specialized (and usually complex) compounds which appreciably improve the service obtained from well-known and established present materials. These products which, when added in small amounts, markedly change the characteristics of the primary material are generally described as additives.

The petroleum industry offers an excellent example of this trend. We have greatly increased the suitability of the gasoline produced from petroleum for use as motor fuel. Nevertheless, we have improved this suitability to perhaps an even greater extent by the development of additives to better the anti-knock characteristics, along with those to prevent oxidation, gum formation, and water precipitation. The base lubricants made today are better than even those which could practicably be isolated from the most suitable petroleum a few years ago; yet the greatest progress in automobile oils has resulted from additives such as detergents, anti-oxidants, pour point depressors and similar. Many other examples could be given.

A similar development is now occurring in asphalt. In our view there is much to be done in the way of bettering base asphalts. At the same time we envisage the possibility of greatly improving the characteristics of those we have by the use of additives. These include additives to aid the cohesion or resistance to cohesion loss from water action; products to accentuate the rheological characteristics of blown asphalt; and rubbers to give toughness and improve low temperature characteristics. Anti-oxidants and other chemicals for various purposes are further possibilities. In fact, the development

COMMENTS

of Additives

By H. G. Nevitt

of asphalt additives is probably in its infancy.

Recognizing this development, what should the highway engineer do about it? He can build excellent pavements for all types of traffic with asphalt if he follows established procedures and takes the precautions indicated by them. At the same time he would like to build better — that is, more economical and more durable — pavements. If additives will bring about this desirable result, he wants to encourage them. But he cannot afford to waste his funds on unlimited experimentation, or jeopardize the success of his badly needed end product, the finished highway, by trying out unproved materials or methods no matter how attractive the sales talk.

Nor yet can he refuse to aid progress in a wise and justifiably careful fashion. The age of materials gave him many problems; the age of additives will multiply them tremendously because of the new and different possibilities in this field.

The decisions involved are among the most perplexing ones facing the highway engineer today. He cannot be relieved of the responsibility nor will the problems ever become easy. That he needs help in forming his views and policies seems unquestionable.

We think this is a very important subject. Its handling will markedly affect our future. If new ideas, backed up by real work and resultant facts, are not greeted with understanding and co-operation, our highways will not share in the rapid technological progress seen all around us. On the other hand, if greatly needed highway funds are spent on fruitless experimentation based on insufficient data or preliminary exploration — or if aid is given to ideas presented with plausible approach but lacking real merit to the neglect of those deserving support — the inevitable reaction will be equally unsatisfactory. The only solution is sound understanding on the part of those in a position to adopt or encourage new ideas, reflected in rules for evaluation thereof which bring out the needed facts. Some such rules can be suggested for use in considering the claims made for all new materials and methods; they are essentially the application of common sense.

Before discussing them we wish to again emphasize the point that in the end no one gains by the encouragement of unsound promotions, or of those in which the facts have not been developed to the point required by the proposed use. Even their promoters will find the final balance sheet is in the red, no matter how apparently successful has been the selling of the idea.

The first rule that can be laid down for considering new developments is that the claims made should be reduced to quantitative rather qualitative statements. More desirable characteristics in a finished pavement structure or some portion thereof can be visualized as the result of many possible steps. The great majority of the steps offer benefits of such negligible magnitude that they do not justify further consideration. The way to bring this out is to get the figures on the amount of the benefits. This may seem a trite and obvious statement. However, the careful reader of promotional literature will be surprised at the frequent lack of such information, at least with regard to the results obtained on the job itself. Many figures may appear, but they are rarely a direct measure of the benefits claimed for the recommendation. It would seem reasonable that those making such claims should obtain some measure of these quantities before approaching potential users.

The Economics

The next rule is that economics primarily control, as we noted in previous articles. The highway engineer today can, with materials generally available and methods fairly well proven, produce an extremely satisfactory highway structure. We question if a road can be built which gives the user more in the way of needed service than the modern properly designed asphalt pavement covered with a well constructed and maintained chip seal. It can and should have smoothness, safety as represented by good traction and non-skid characteristics, driving ease from proper reflectivity, and any other reasonable characteristics that the modern vehicle can take advantage of.

For any proposed improvement to give a better road, it must lead to more highways for the available money. The pavement mixture can exhibit bounce, good low temperature characteristics, resistance to laboratory freezing and thawing, or any other characteristics; but if these virtues are not needed to produce highways of the type described and cost more money per mile, they do not represent a benefit.

Therefore, every improvement offered must mean a saving in over-all unit cost to build the type of highway needed. If an additive gives a stronger pavement, this is only helpful if it means that the pavement can be built of sufficiently less thickness that its net cost per mile is lower. If the benefit is for easier construction, such as ability to work in bad weather, this must clearly end up in lower bids for the job due to the use of the helpful material. The benefit, to be usable, must end up as an economic one.

Longer Life Sought

It is of course understood that the over-all unit cost referred to here covers both construction and maintenance. Since, as already pointed out, the initial quality of good construction can hardly be improved this matter of greater serviceability may be the dominant one. It is doubtful if many highway engineers will accept reduced pavement thicknesses to offset the increased costs resulting from additive usage — in the majority of construction we now seem at about the minimum thickness for a number of reasons. So a longer life for the initial quality and reduced costs to hold the surface to it appear the need from most additives.

This basic economic requirement seems a hard point to get over. It is resisted by many promoters of new materials and methods, and it is often ignored by those considering their use. We will risk discussing a definite example, the use of rubber in pavement. It seems impossible to question that the addition of certain rubbers under the proper circumstances will greatly enhance some desirable properties of the asphalt binder and potentially produce a superior paving mix. At the same time the addition of this rubber costs money and adds to the price of

(Continued on page 132)

● Laying asphaltic surface course with Blaw-Knox paver and Galion rollers.

BITUMINOUS OVERLAY

Strengthens Wartime Fighter Base for Modern Commercial Aircraft

By JACK H. GOULD, *Associate Editor of Roads and Streets*

Design and construction details of pavement strengthening program at Richmond's Richard E. Byrd field.

LIKE many another city, Richmond in Virginia got back an airfield from the federal government after the last war. What had to be done to modernize the runways and other paving for today's heavy planes represents an interesting example in asphaltic pavement overlay construction.

Richard E. Byrd Flying Field, taken over and improved during the war as a fighter base, was returned to the city in 1947 along with all improvements made by the federal government. The pavement system included three runways each 300 x 5,000 ft., two of concrete and one with 150 ft. width of asphaltic concrete flanked on either side with 75 ft. of portland cement concrete. The latter runway has been little used by commercial planes except as a taxiway.

These runways and the taxiways were designed for a 25,000 lb. wheel loading, for which the 6 in. of plain concrete on 10 in. of gravel subbase was adequate.

When the city resumed operation of the airport in 1947, there were only two DC-3 flights daily. Since that time four additional airlines have started service. As the demand for service increased, new flights were added and larger planes put in service.

Today the flights number 60 daily. The majority of the planes have a maximum gross landing weight of 44,000 to 88,000 lb. instead of 23,500.

A problem peculiar to Richmond is the diversion from time to time of transcontinental and international flights to Richmond from New York and Washington due to weather conditions at these locations. In most cases these conditions are preceded by rain at Richmond. Aircraft on these flights generally have a maximum weight of well over 100,000 lb.

Several years ago the runways and taxiways began pumping badly. Sections of taxiway pavement failed and had to be replaced. Richmond's Department of Public Works made various studies of methods of increasing the capacity of the runways. A system of perforated drains was installed to provide subsurface drainage. This installation is the subject of another report.

The Bureau of Engineering considered the effect of different types of bituminous mix overlays of various thicknesses on increasing the load capacity of the pavement. During the period the airport was under military control, load bearing tests were made by the Norfolk District, Corps of Engineers. Using the results of these tests the bureau determined by calculations that an overlay consisting of 2¼ in. of coarse binder and 1¼ in. of

coarse grade surface would increase the capacity of the pavement to provide for wheel loads of 65,000 lb. These calculations were compared with Corps of Engineer curves for pavement design and found to be identical.

In 1954, a contract was awarded to Asphalt Paving Service of Richmond, Va., for laying plant mix on the taxiways leading from the terminal ramps to runway 2-20, the main north-south runway. This pavement had the greatest number of failures. Prior to awarding this contract, city forces removed the broken concrete sections and replaced them with concrete.

The contract for laying plant mix required that all old joint material and asphalt patching be removed from existing concrete pavement.

Three thousand nine hundred tons of Virginia Department of Highways J-1 (2) binder was laid to a compacted depth of 1½ in. 2,600 tons of Virginia Department of Highways I-3 (modified) top was laid to a compacted depth of 1 in. 60-70 penetration asphalt was used in both mixes. Joint material removed was not replaced. An Adnum paver, one Galion 10-ton 3-wheel roller and one Galion 10-ton tandem roller were used on this w[illegible] m density was specified at 95%; no stability was specified. Cost of the binder and top in place was $5.65 per ton which included cleaning joints and removing asphalt surface patches.

Asphalt Specifications

J-1 (2) Binder

Screen Size	*Total % Passing*
1¾ in.	100
1 in.	95-100
½ in.	35-75
No. 10	15-30
No. 200	0-5

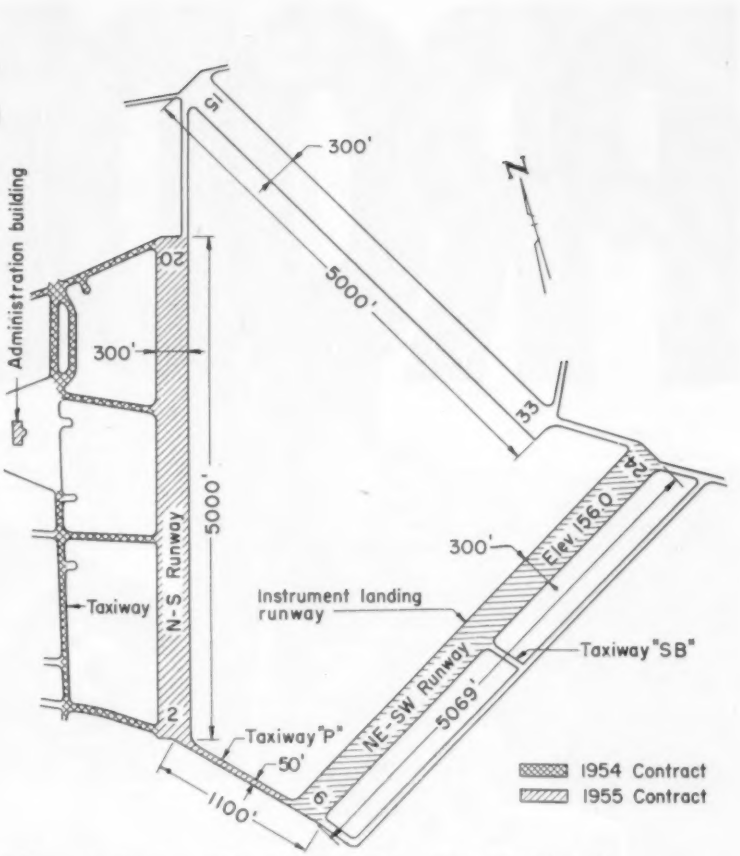
Percent asphalt — 5

I-3 (Modified) Top

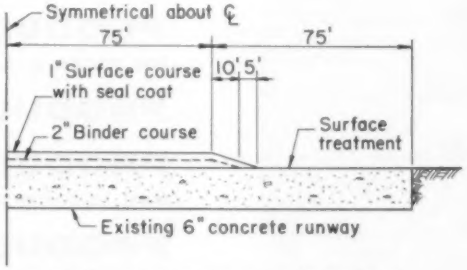
Screen Size	*Total % Passing*
½ in.	100
⅜ in.	80-100
No. 4	50-70
No. 10	35-50
No. 40	10-25
No. 80	3-15
No. 200	2-10

Percent asphalt — 6

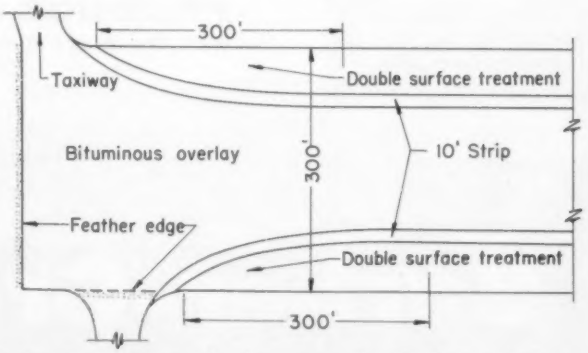
Coarse aggregate was all crushed gravel meeting the requirement of 80% of the particles retained on each sieve showing not less than 40% fractured surfaces. Fine aggregate used consisted of 50% natural sand and 50% manufactured sand obtained from gravel screenings. This project was limited to the terminal taxiways only,



● Figure 1. Key map, Richard E. Byrd Flying Field (Municipal Airport), Richmond, Va.

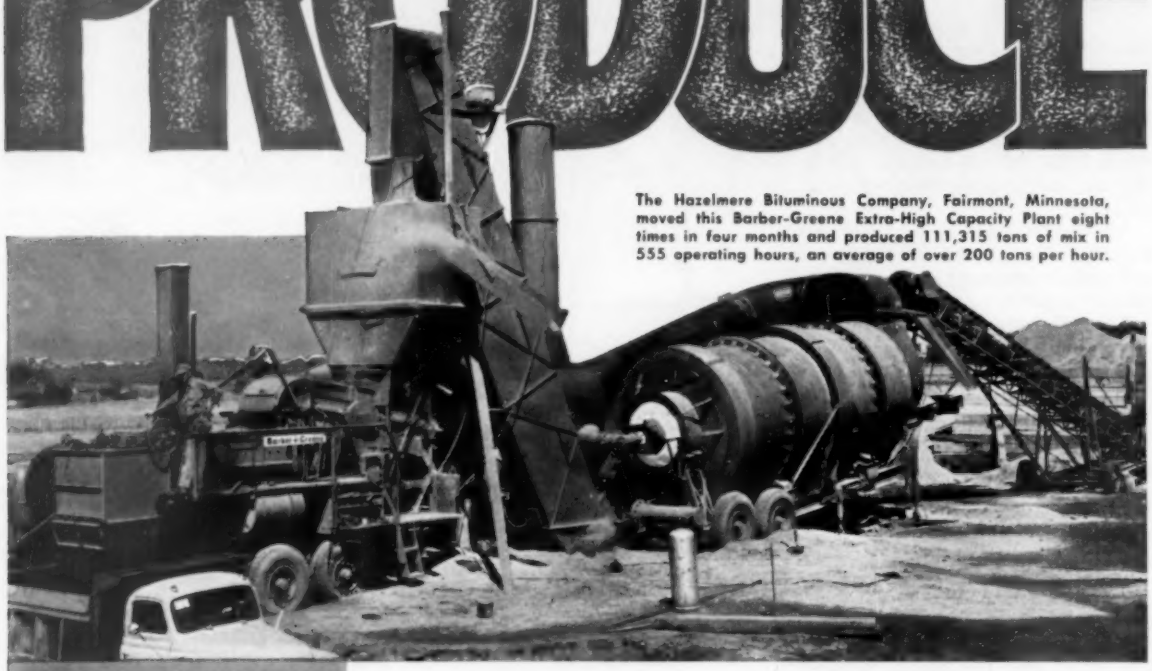


● Figure 2. Typical section for resurfacing runways 6-24 and 2-20.



● Figure 3. Detail of paving at ends of runways and taxiway intersections, showing curved edge of asphaltic overlay in center zone, flanked by 10-ft. unsurfaced strips separating overlay and sealed areas.

PRODUCE



The Hazelmere Bituminous Company, Fairmont, Minnesota, moved this Barber-Greene Extra-High Capacity Plant eight times in four months and produced 111,315 tons of mix in 555 operating hours, an average of over 200 tons per hour.

NEW Model 848
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NEW Model 838 Dryer

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Dust Collector

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Bituminous Plant

PRODUCE more tonnage per hour for more profit per season.

PRODUCE mixes to meet all specifications.

PRODUCE continuously with the plant that is inherently automatic.

PRODUCE uniformly with interlocked proportioning.

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CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

BG

. . . for more details circle 184, page 16

● Etnyre 2,080 gal. stainless steel distributor applying surface treatment. Adams Construction Co., Roanoke, Va., sub-contractor for this work, has reputation for keeping equipment in top condition. Distributor 3 yr. old but looks "just from factory."

since no federal airport funds were available that fiscal year. The entire cost was borne by the city.

Various Schemes Considered

CAA requirements for Class IV airports require that runways have a minimum width of 150 ft. A bituminous overlay the full 300 ft. runway width at Richmond did not seem justified since it meant twice the outlay necessary for commercial requirements. However complete sealing of the runways was necessary. Consideration was given to removing the outer 75 ft. and relocating the night lighting.

Estimates based on removing the outer 75 ft. of existing runways and relocating night lighting clearly indicated that to break-out and remove the existing concrete, relocate the night lighting (all lights are set in concrete vaults) and then top-soil and seed the former pavement area, would be prohibitive.

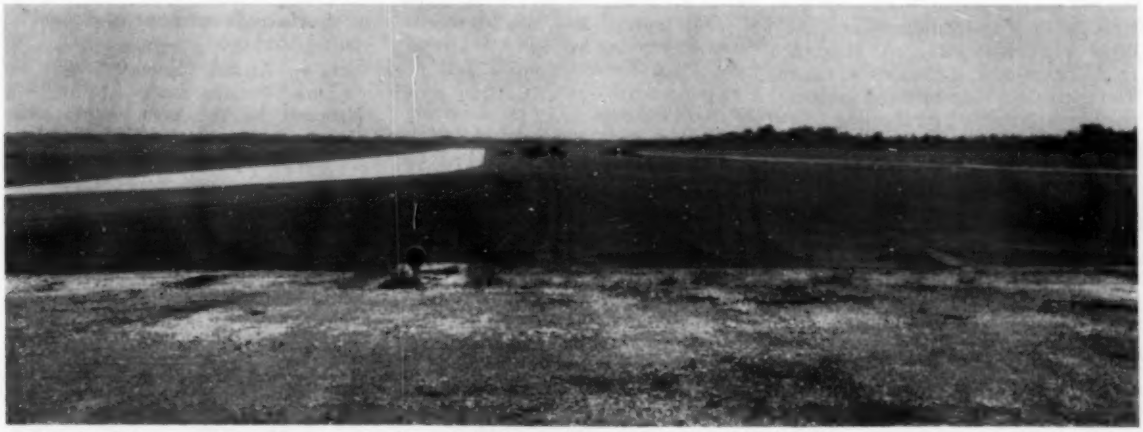
CAA officials agreed to paving the center 150 ft. with plant mix and applying double surface treatment on the outer 75 ft. Over the objections of the city's works department officials and the airport manager, CAA officials insisted that the center 150 ft. be given a seal coat of RC-2 and No. 15 crushed limestone aggregate light in color (CAA Standard Specifications, P-604) to provide a color contrast with the local gravel used on the surface treatment, which is light tan in color. CAA officials based their requirement for the light-colored seal coat on the fact that it would eliminate a considerable portion of the heat waves arising from the runways in hot weather. They state that these heat waves make it difficult for pilots to judge their height above the runway when setting down for a landing.

The city originally planned to provide a sand seal treatment at taxiway-runway, intersections where locked wheel turns were made and outboard engines of 4-engine aircraft were cut. When these engines are cut a considerable quantity of gasoline is spilled. Being highly volatile it evaporates quickly with little harm to the asphalt, but if other aircraft follow closely the wheels will displace the asphalt if the gas has not evaporated.

In the fall of 1954, bids were sought on the following work, with the stipulation that no paving should begin before April 1, 1955, although stripping of old asphalt patches and cleaning of joints might begin a little earlier. The city reserved the right to award not more than $300,000 worth of work due to limited availability of funds.

Part I of this work covering the asphaltic concrete comprised 24,350 tons of asphalt binder, Virginia Department of Highways Specifications Type H-3 (1); and 12,750 tons of asphalt top, VDH specs. Type I-3. Highway department specifications were modified to require 120-150 penetration asphalt, AASHO designation M-20 and M-22. Binder and top were required to have a density of 92 percent to 95 percent. No stability specification was included.

Although highway department specifications require only that one 10-ton tandem or 10-ton 3-wheel roller be provided for each 35 tons of asphalt laid per hour, the special provisions required two 10-ton 3-wheel rollers for each asphalt spreader.



● Resurfaced Runway 6-24 as seen from end zone, showing contrast between plant mix and double surface treatment before seal coat has been applied to center section.

● Tampo 8-ton, 9-wheel rubber-tired roller has adequate speed to keep up with distributor and spreaders.

Unit price bid per ton included removal of all bituminous joint filler and loose concrete from the existing pavement, cleaning of expansion joints to a depth of one inch, and removal of all fat asphalt surface patches. Coarse aggregate for the binder and top were required to be crushed stone or crushed gravel. Crushed gravel had to meet the requirement of 80 percent of the particles retained on each sieve show not less than 30 percent fractured surfaces. Fine aggregate was required to be natural sand, sand manufactured from crushed gravel, or a combination thereof. The use of crushed stone screenings was prohibited.

Part II covering sealing included 143,700 gal. of RC-2; 1,260 tons of No. 15 light-colored limestone for seal coat; 2,190 tons of No. 7 cover aggregate; 1,960 tons of No. 8 cover aggregate. Specifications for the seal coat are covered by Item P-604 and for the double surface treatment by Item P-609, of the Standard Specifications for Construction of Airports, U. S. Department of Commerce, CAA latest edition. Rubber-tired rollers only were permitted on the seal coat and surface treatment work. Bid price per gallon of RC-2 included removal of all loose and scaling surface from the concrete before application of surface treatment.

Provision was also made for brooming the seal-coat and surface-treated areas one week after they were laid, if necessary.

Part III covered marking of runways and taxiways in accordance with CAA specifications and standards. This required 1,000 gal. of runway marking paint and 10 gal. of taxiway marking paint.

The right was reserved by the city to award one contract for all work under the three parts of the proposal, a separate contract for Part I, II, or III, or a contract for any combination of the three parts of the proposal. Asphalt Paving Service, Inc., was successful bidder on Parts I and II, Clyde Royal Co., of Hampton, Va., was awarded Part III.

Prices bid by Asphalt Paving Service were:

H-3 (1) binder — $6.04 ton
I-3 top — $6.04 ton
RC-2 — $.12 gal.
No. 7 & 8 stone — $3.72 ton
No. 15 limestone — $5.90 ton

Laying Procedures

The contractor was permitted to work on only one runway at a time, and required to remove all equipment from the vicinity of the runways each night. Work on Part I commenced on April 4, 1955, and placement of the 37,000 tons of mix was completed June 30 working five 10-hour days per week. The layers were 231 and 116 lb. per sq. yd., totaling 3¼ in. compacted thickness.

No tack coat was used under the binder except at the edges where the binder and top were feathered to meet the existing pavement. Original plans did not provide for this procedure, but it was found after laying the top course on the side of one runway that a fog coat of RC-2 under the first 5 ft. of topping width provided better bond with the existing concrete.

Plant mix was produced by a Simplicity 100-ton per hour plant located 4 miles from the airport. This plant, by the way, is 16 years old. Its excellent condition and performance despite several relocations is a tribute among other things to the value of regular maintenance and annual overhaul.

Binder placement averaged 800 tons and topping at 650 tons per day, with a maximum day of 950 tons. Tonnage on the topping was not as high due to the increased drying time required by the natural sand. The plant mix was placed by one of the first models of the new Blaw-Knox rubber-tired bituminous pavers. This paver spread 7½ ton truck loads in well under .wo minutes. Edges of the lane were clean-cut, with virtually no hand raking or shoveling necessary. Uniformity of depth was indicated by the final inspection of the 170,000 sq. yd. area on the two runways after a heavy rain. Very few "bird-baths" were found that required leveling.

Alternate 12 and 13 ft. lanes were laid, the joints between the binder and top being lapped 2 ft. Two 10-12 ton Galion 3-wheel rollers were used.

The paving crew consisted of one superintendent, one paver operator, two roller operators, and two laborers. The only difficulty encountered on the job was the slippage of the rubber-tired wheels of the paver on the RC-2 tack coat. This trouble was eliminated by switching to AE-2.

Asphalt Specification

H-3 (1) Binder

Screen Size	*Total % Passing*
2 in.	100
1½ in.	90-100
¾ in.	65-80
No. 4	30-45
No. 10	20-35
No. 200	0-5

Percent of asphalt — 4.8

I-3 aggregate was obtained by using 50 percent crusher sand and 50 percent No. 11 crusher screenings (gravel).

Surface Treatment and Seal

Part II of the contract was sublet by Asphalt Paving Service to Adams Construction Co., Inc., of Roanoke, Va. The concrete surface was broomed then RC-2 was applied at .4 gal. per sq. yd. by an Etnyre 2,080-gal. stainless steel distributor, followed by 15 lb. of No. 7 crushed gravel. A second 0.4 gal. application of RC-2 was followed by 15 lb. of No. 8 stone. In each case the gravel was rolled by a Tampo 8-ton, 9-wheel rubber-tired roller. The speed of this roller is such that only one was required to keep up with the distributor and spreaders. Adhesion of the gravel was excellent and there was no appreciable crushing of the aggregate.

Application of the seal coat to the

runways utilized the same equipment, except that the seal coat was rolled once with a 10-ton tandem roller followed by the rubber-tired roller. RC-2 was applied at the rate of .017 gal. per sq. yd, followed by 12 lb. of No. 15 white limestone.

Some difficulty was encountered in obtaining the proper gradation of limestone. Several carloads were rejected and a new source of supply was found. The material from the new supply was within specifications, but the capacity of the quarry was such that it was necessary to close down the job for approximately two weeks until a sufficient supply was on hand to provide for continuous laying of this material.

If a seal coat was necessary for the reasons set forth by CAA, it appears that the application of this seal coat should have followed the laying of the plant mix topping while the mix was still hot. Inspection of the runways from the air, in late summer, indicated that the seal coat was being erased from the runways in the end-zones where the aircraft first touch down. To further delineate the landing area of the runways, no seal coat was applied for a width of 10 ft. from the surface treatment.

Following completion of the paving on runway 6-24, there were still indications that there was some pumping between the joints of the underlying pavement where the material from the expansion joints was not replaced. It was the opinion of both CAA and city officials however after inspection in August that the pumping was subsiding. Also that sealing would eliminate all further difficulty, since storm water would be diverted to numerous catch basins along the runways.

Short of constructing new runways, it appears that the method employed here is the most economical method of utilizing present facilities. A repetition of this overlay procedure is contemplated if and when still heavier plane loads must be carried. The total contract price for Parts I and II was $287,000.

New AED rental rate list published

Associated Equipment Distributors, the National Trade Association of the Construction Equipment Industry, announces that its all new, 1955, Seventh Edition "Compilation of Rental Rates for Construction Equipment" is now available to the construction industry.

Compiled and published for the information of construction equipment users everywhere, the 80-page book contains the national average rental rates for some two-thousand items of construction machinery, and illustrates many of the major types of equipment.

Rental rates appearing in the 1955 "Green Book," as it is popularly known in the industry, were established by AED survey conducted during the past 90 days among the Association's 700 domestic distributor members.

Average Number of Bids Received on Federal-Aid Projects

Second Quarter — 1955

(Compiled by U.S. Bureau of Public Roads)

STATE	824 Projects[1]		417 Projects[2]		1241 Projects[3]	
	Average Number of Bids	Percentage Below Eng. Est.*	Average Number of Bids	Percentage Below Eng. Est.*	Average Number of Bids	Percentage Below Eng. Est.*
Alabama (A)	8.3	6.0	—	—	8.3	6.0
Arizona	7.1	1.8	5.0	+0.1	6.3	1.5
Arkansas (A)	7.4	13.8	—	—	7.4	13.8
California (A)	5.8	13.2	—	—	5.8	13.2
Colorado	9.6	4.1	6.6	1.3	8.1	3.3
Connecticut	6.5	6.1	3.0	5.6	5.3	6.0
Delaware	5.3	6.3	4.0	15.6	4.8	7.4
Florida (A)	5.8	8.4	—	—	5.8	8.4
Georgia (A)	8.0	16.4	—	—	8.0	16.4
Idaho	4.0	10.5	4.3	6.2	4.2	9.5
Illinois (A)	5.4	5.9	—	—	5.4	5.9
Indiana	6.3	24.6	6.5	19.9	6.4	21.8
Iowa (A)	4.1	1.3	—	—	4.1	1.3
Kansas (A)	5.4	+1.4	—	—	5.4	+1.4
Kentucky (A)	3.2	19.4	—	—	3.2	19.4
Louisiana (A)	6.1	7.5	—	—	6.1	7.5
Maine (A)	4.0	7.2	—	—	4.0	7.2
Maryland (A)	6.2	1.8	—	—	6.2	1.8
Massachusetts (A)	8.5	4.9	—	—	8.5	4.9
Michigan (A)	5.5	3.8	—	—	5.5	3.8
Minnesota	5.8	2.4	4.5	12.8	4.7	6.7
Mississippi (A)	8.0	11.0	—	—	8.0	11.0
Missouri (A)	4.6	10.1	—	—	4.6	10.1
Montana	5.3	6.9	5.7	4.7	5.4	6.4
Nebraska (A)	4.4	7.5	—	—	4.4	7.5
Nevada	6.3	16.2	4.3	15.8	5.1	16.1
New Hampshire (A)	4.4	2.1	—	—	4.4	2.1
New Jersey	5.4	21.6	7.1	11.8	6.5	19.0
New Mexico	8.3	19.3	5.6	9.7	6.4	14.0
New York (A)	6.0	17.9	—	—	6.0	17.9
North Carolina (A)	7.0	9.3	—	—	7.0	9.3
North Dakota	6.5	13.9	6.0	16.4	6.1	14.6
Ohio	8.7	19.0	3.6	10.0	4.8	16.4
Oklahoma	5.9	1.7	5.0	2.8	5.6	2.1
Oregon (A)	7.4	6.1	—	—	7.4	6.1
Pennsylvania (A)	6.0	14.0	—	—	6.0	14.0
Rhode Island	—	—	7.0	6.3	7.0	6.3
South Carolina (A)	6.6	1.1	—	—	6.6	1.1
South Dakota (A)	7.6	6.9	—	—	7.6	6.9
Tennessee (A)	6.1	6.6	—	—	6.1	6.6
Texas (A)	6.5	0.5	—	—	6.5	0.5
Utah (A)	7.4	4.3	—	—	7.4	4.3
Vermont (A)	4.3	8.3	—	—	4.3	8.3
Virginia (A)	4.0	9.0	—	—	4.0	9.0
Washington	5.9	9.9	5.6	8.3	5.7	9.4
West Virginia	2.8	+3.2	5.4	13.2	4.5	9.6
Wisconsin (A)	4.7	+1.6	—	—	4.7	+1.6
Wyoming	8.1	+1.6	7.6	+10.5	8.0	+3.3
District of Columbia	4.0	5.0	4.5	+ 4.5	4.4	+2.3
Hawaii	—	—	4.0	+ 8.6	4.0	+8.6
Puerto Rico	3.5	12.6	6.0	9.4	5.0	11.5
Average	5.8	8.5	5.1	9.4	5.6	8.6

[1]Secondary projects not included.
[2]Secondary projects only—excluding states operating under 1954 Secondary Road Plan.
[3]Column 1 plus 2.
*Percentage above engineer's estimate denoted by + (plus).
(A) Adopted 1954 Secondary Road Plan on or before April 1, 1955.

Small City Contracts for Street Maintenance

● Applying single surface treatment to a residential street, for which City of Portsmouth recently accepted responsibility. Street formerly belonged to Government Housing Project.

SMALL cities might well follow the example of Portsmouth, Va., where for over ten years the city has contracted annually for street maintenance work.

Each spring the city asks for bids on crushed stone, asphalt, cement, plant mix asphalt (Virginia Department of Highways H-3 (1) base, H-2 binder, and I-3 top) and contractural services for applying surface treatment, and laying plant mix.

Bids are received on stone delivered to the city yards; asphalt cement f.o.b. distributor at bulk petroleum plant; mix, f.o.b. trucks at successful bidders asphalt plant. The procedure followed for some years is for the city to furnish all materials to the low bidder for contractural services.

Bids for contractural services are asked for on the basis of cost per ton of spreading stone and plant mix asphalt; and cost per gallon for shooting asphalt.

The unit prices include furnishing loading equipment for stone at the city yard, all trucks, spreaders, rollers, distributors, sweepers, and men. Unit prices on laying plant mix asphalt include all trucks, pavers, rollers, operating personnel, and laborers.

During the 1955 construction season the city expects to complete approximately $100,000 worth of street maintenance. Being at sea-level and with very poor sub-grade material the city has found it essential that the existing streets be kept sealed. Experience is that once the pavement cracks and water reaches the subgrade, deterioration of the entire pavement is rapid.

On light residential and secondary streets a single or double surface treatment is used. The rate of application of RC-2 and stone, and the decision as to whether single or double treatment will be used, is determined by field inspection.

Plant mix asphalt is used on primary streets and heavily traveled secondary streets. The contractor is paid monthly on the basis of delivery tickets from the city yard and the city's vendors of asphalt cement and plant mix.

F. J. Bergeron, City Engineer, advises that the city could not begin to perform the services rendered by the contractor at the prices they have been able to obtain. He points out that the city would have to make a very sizable capital investment in equipment the larger protion of which could only be used part of the year. He prefers instead to use the money which would be tied up in equipment to extend his street maintenance program.

This year as for several years past, the firm of J. R. Ford Co., Lynchburg, Va., holds the contract for both surface treatment and plant mix.

Through an error in our own offices this article was not included in the September issue of ROADS AND STREETS. *We are doubly embarrassed since the article was referred to editorially in the last issue.*

We suggest that every city official read this article and then read the editorial "Contracting Street Maintenance" on page 41 of the September issue.

Our apologies to our readers and particularly to F. J. Bergeron, City Engineer, Portsmouth.

New 16mm color-sound construction film

Ingersoll-Rand announces the availability of a new 16mm sound color film entitled "The Long Street" which deals with modern super highway construction. The film is a professional production employing skilled actors and is built around the story of a small town druggist who resisted the construction of a new super highway near his community. Through his eyes the viewer sees how modern contractors tackle the problem of rock removal. He sees compressed air in action — operating all kinds of rock drills and other air operated tools as well as other construction equipment. The film may be obtained from Ingersoll-Rand Company (Film Service Dept.) Phillipsburg, New Jersey for showings. There is no charge except for return postage.

What's New
in Equipment and Materials

Reader Service Coupon on Page 16, more items pages 103-110

Mobile, Theft-Proof Storage Shed

"An economical, theft-resistant, and entirely mobile storage enclosure for materials spotted on the job" is the general description given by Material Master, Inc., 3508 W. Irving Park Road, Chicago 18, Ill., to the corrugated steel, hard wood base structure here shown in service position on a residential development. For transport behind truck or auto, a 2-wheel trailer set-up is used.

The "Material Master" for Safe Housing

The "Material Master" is 45 in. wide, 50 in. high, and is available in lengths from 42 to 128 in. Features listed are its advantage as a job-expediter; ability to save trucking and manual labor storage and transport material from job to job or from home office to job; and its unique, patented base which allows it to be permanently and safely secured on any job site.

For more information circle 119 on Service Coupon Page 16 and mail now.

Reflective Striping Material

Prismo Premix — a premixed, reflective stripping material that applies smoothly, drys very fast, and has excellent wearing characteristics, has been announced by Prismo Safety Corp., Huntingdon, Pa. It was developed primarily for applications in busy, downtown areas where a fast-drying, "once over" striping material is essential. It is a ready-mixed sphere-binder compound which is designed for direct application from the drum, with a minimum amount of agitation. The compound consists of a specially formulated semi-plastic binder into which has been mixed millions of microscopic glass spheres. These spheres are so tiny, so thoroughly distributed that the mixture may be sprayed, hand-painted or applied through standard application equipment.

For more information circle 120 on Service Coupon Page 16 and mail now.

New Line of Steel Buildings

The Steelcraft Manufacturing Co. of Rossmoyne, Ohio, manufacturers of steel buildings for industrial, commercial and farm use has just announced a complete new line of standard (prefabricated) units. Basic feature is a new structural steel system, the principal members being tapered rigid frames. These buildings supplement Steelcraft's older line of buildings, which includes both truss type and structural rigid frame. The new series is lower in cost and is said to have many advantages and exclusive features.

The tapered frame presents a new superimposed fastening system which speeds the application of covering to framework. Holes in the purlins and girts provide a locating point for connecting roof and wall sheets. In this manner one man can attach the sheets from the sides or roof of the building, eliminating labor from the inside and scaffolding. A new base shoe connection allows the frame to be assembled on the ground and raised into place with a minimum of equipment.

For more information circle 121 on Service Coupon Page 16 and mail now.

In Rome, Italy

Moto-Paver resurfacing airport at Rome, Italy

or Rome, N.Y.

Moto-Patcher repairing street, Rome, N. Y.

Moto-Paver and Moto-Patcher Speed the Job—Cut the Cost

In Rome, Italy, the main runway of the Ciampino Airport was completely resurfaced in two weeks recently with a single Moto-Paver. This job was accomplished while the runway was in daily use, and could be worked on only three hours each day.

In Rome, New York, both the Moto-Paver and the Moto-Patcher have delivered cost-cutting performances in resurfacing and patching streets respectively. These are but two examples of how the Moto-Paver and Moto-Patcher are speeding the job and cutting the cost on road, street and airport jobs in all parts of the U. S., Canada, South America, Europe and Africa.

New Bulletin MP-55 will be sent on request.

HETHERINGTON & BERNER INC. • *Engineers—Manufacturers*
721 KENTUCKY AVENUE INDIANAPOLIS 7, INDIANA

. . . for more details circle 211, page 16

Sixteen-Yard Wagon

A new multi-purpose "Movall Wagon" for use with Caterpillar DW15 tractors is announced by C & D Manufacturing Co., Perkins, Calif. It has a heaped capacity of 16 cu. yd. (12 cu. yd. struck) and a carrying capacity of 44,000 lb. (22 tons). It is intended for use with DW15 tractors now in the field, or with new prime mover units. Under favorable job conditions, it can also be used with Cat DW10 tractors.

The New "Movall" Wagon

Known as the "RD15 Movall," the new wagon has the many proven features of the larger 25-yd. unit. These include the positive cable-controlled (out the rear) ejection which enables Movall wagons to handle any material that can be top-loaded — dirt, mud, ore, aggregate, surfacing materials, etc. This dumping principle provides maximum safety when dumping over the edge of a fill by permitting the load to be dumped with all brakes locked, without raising the body and with the drive wheels well away from the edge. In addition, the low center of gravity permits dumping at any travel speed. Standard Caterpillar No. 27 cable controls are used. Optional equipment includes ejector sideboards for greater capacity with light materials, and a detachable rock guard.

For more information circle 122 on Service Coupon Page 16 and mail now.

Eye Bolts for Material Handling

A new line of "Cleveland" drop forged heat treated eye bolts in both shoulder pattern and plain pattern, announced by Cleveland Hardware and Forging Co., are specifically designed for material handling and lifting application where high strength and maximum safety are required.

A new catalog listing sizes and load factors of the new eye bolts can be obtained by writing to Cleveland Hardware & Forging Co., 3270 East 79th St., Cleveland 4, Ohio. — Ask for Catalog 50.

For more information circle 123 on Service Coupon Page 16 and mail now.

Batching Bin

A new batching bin, the "Conveyex," announced by Construction Machinery Sales Co., Waterloo, Iowa, is stated to be particularly useful to smaller ready-mix operators as an efficient low-cost way to accurately batch to truck mixers. It also is stated to be useful to bigger plant operators who need an auxiliary portable set-up to shorten the haul on jobs in outlying areas and with contractors for bridge work, housing projects and similar jobs.

With two, or three compartments which can be readily loaded with a front end loader, the Conveyex batches each aggregate separately onto a troughing belt conveyor for charging mixers. Scale

LITTLEFORD
LB
LITTLEFORD
Littleford Bros., Inc.
454 E. Pearl St.,
Cincinnati 2, Ohio
Wide spray bar saves time and money. Shown here is Lite-Wate end folding full circulating bar, mechanical type . . . standard on Littleford SPRAY-MASTER Bituminous Distributor. Spray bars can be furnished up to 24-ft. wide.
Get the facts before you buy . . . send for bulletin BB-14.
Spray . . . faster . . . easier . . . and cheaper
with Littleford "SPRAY MASTER" Bituminous Distributor

. . . for more details circle 223, page 16

is of the decumulative type which comes back into balance as the indicated amount is discharged from each compartment. Conveyex is offered with separate cement compartment and scale

Conveyex Batching Plant

beam. It is stated the cement-handling Conveyex will save money even when using bag cement, but is more effective when bulk cement is employed. A dust cover for the conveyor is available when desired. A number of the batching bins are presently in operation in the United States and Canada.

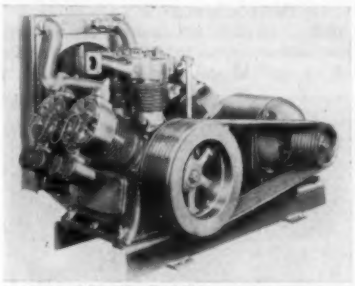
For more information circle 124 on Service Coupon Page 16 and mail now.

50 to 100 HP Stationary Compressor Line

A new line of two-stage, air-cooled, electric motor driven compressors has been announced by the LeRoi Division of Westinghouse Air Brake Co., 1706 South 68th St., Milwaukee 14, Wis. These new 50, 75 and 100 HP stationary compressors have displacements of 260, 415, and 550 cfm at 125 psi operating pressure. The new compressors have a balanced design which reduces vibration and noise to a minimum.

Cylinders are made of alloy iron and are cooled by a high-speed, belt-driven fan which draws air through a sectional-core intercooler and directs air over the cylinders and heads. Air cooling allows installation of the "S" compressor without fear of interruption in the flow of water or freezing of water lines. Each bank of cylinders has individual intake filters. Forced feed lubrication, by a positive plunger type oil pump, adds to the dependable service of the compressor with the least amount of attention.

Standard equipment of these belt-driven compressors includes a Dual-Control. This control gives the operator a choice of start-and-stop duty of both motor and compressor or a continuous running of motor with intermittent compressing. The latter selection permits the compressor cylinders to unload instead of compressing when desired pressure is reached.



New Le Roi Compressor

For more information circle 125 on Service Coupon Page 16 and mail now.

New Wheel-to-Shaft Fastening

The "Gripspring," a new machine element developed in Germany is now being manufactured and marketed in the United States. The device offers a new approach to the problem of fastening hubs onto a shaft without the use of splines or keyways.

The key and keyway has been used for hundreds of years, but has always been a source of trouble because clearances must be provided between hub and shaft in order to make assembly possible. Shrink-and-press fitting assemblies have disadvantages of high cost and impractical disassembly.

The Gripspring provides an assembly which is said to have all the advantages of a shrink fit without any of its disadvantages. There are no clearances; the device is wedged between hub and shaft under pressure by convenient hand tools. The outer ring expands and the inner ring contracts.

Following are the engineering advantages claimed:

Maximum torque due to utilization of full strength of hub and shaft.

Elimination of stress concentrations and notch effects.

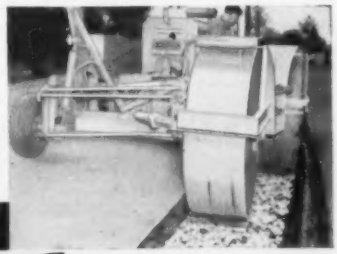
BLAW-KNOX ROAD WIDENER
Spreads 500 tons per day!

This job really rolled for D. E. Smith, Inc. of Mifflin, Pa. Their contract called for widening 3/4th of the stretch from 18′ to 22′, and the balance from 20′ to 24′, spreading 2″ of fines in the bottom of a 3-ft. wide trench and, after compaction, spreading 10″ of No. 4 crushed stone on top of the fines. *The Blaw-Knox Model 95 Road Widener, spreading 500 tons per day, widened approximately 3200′ of highway every 10 hours!*

In addition to speeding operations, Blaw-Knox Road Wideners also lay concrete without forms, handle asphaltic concrete, dirt, gravel, stone or any kind of aggregate. They handle any widening job from 2′ to 10′ widths. They have many other time and money saving features your Blaw-Knox distributor will gladly explain. Call him today.

BLAW-KNOX Dual Compression Trench Rollers

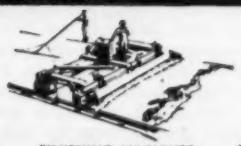
Here's the most flexible and economical trench roller on the market! Width range can be accurately adjusted from a minimum of 20″ to a maximum of 39″, or any intermediate width. The two full-width, 60″ high rolls, used either "dogleg" or tracking each other, *are the equivalent of two separate rollers.*



BLAW-KNOX BLAW-KNOX COMPANY CONSTRUCTION EQUIPMENT DIVISION PITTSBURGH 38, PA.

Ask about the **BLAW-KNOX** *"Complete Package"* of CONCRETE PAVING and READY-MIX EQUIPMENT

CONCRETE SPREADER-VIBRATORS



FINISHING MACHINES

AGGREGATE BATCHING PLANTS

HI-BOY TRUKMIXERS

. . . for more details circle 186, page 16

No relative motion, backlash play and hammering.

Concentricity depends on Gripspring rather than hub and shaft.

Easy to assemble and disassemble.

Eliminates costly machinery and hand-fitted assemblies.

Grinding usually can be eliminated.

Permits use of smaller diameter shafts and hubs.

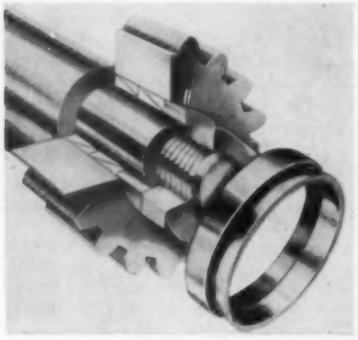
Less space and weight required.

Hermetically seals hub to shaft.

No fretting or corrosion.

Perfect seal against air and liquids.

Lower cost.



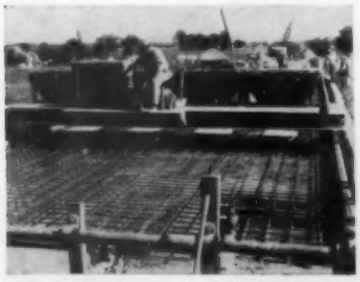
The "Gripspring"

Gripsprings are manufactured and distributed in the United States by the U. S. Automatic Corp., Amherst, Ohio. Descriptive literature and present use prints are available.

For more information circle 126 on Service Coupon this page and mail now.

Concrete Conveyor-Car For Bridges

A new type of concrete conveyor-car for use in bridge construction, developed by Penn Iron Works, Inc., Reading, Pa., is claimed to handle up to 80 cu. yd. of concrete per hour. The unit is reported to be four times as fast as pouring by the hand cart method. In a test situation, it poured concrete for a 300-ft.-long bridge in a half a day. Capacity of the conveyor-car is from 5 to 6 cu. yd. of concrete, carried in four separate hoppers. It is used to convey and deposit concrete, wherever required on bridges for subsequent spreading and finishing. The machine weighs five tons assembled, motor included. It is self-propelled, has an 8-ft. wide frame, and runs on the same tracks as that used by the standard concrete finishing machine.



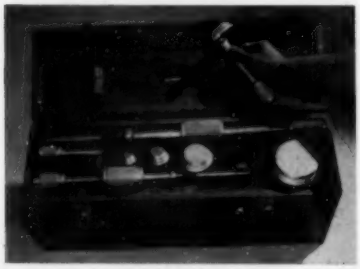
Conveyor-Car in Position to Discharge Car Concrete

Length of the conveyor-car can be varied to suit the width of any concrete highway strip. Adjustments for length are in 6 in. increments. With this type conveyor, there is no need for a wood runway as required when conveying by hand carts. When desired, addition of a vibrator screed permits use of the car for finishing as well as conveying concrete. The entire unit can be moved by truck trailer and set on the tracks with a mobile crane. Two of the new units are already in operation on the Ohio Turnpike.

For more information circle 127 on Service Coupon Page 16 and mail now.

Oil Seal Puller

Patton Manufacturing Co., 1802 West Pleasant St., Springfield, Ohio, manufacturers of precision products, is now marketing their patented oil seal puller to repair shops in the following industries: construction, aviation, automotive, agriculture, oilfield and marine.



Oil Seal Puller Set

Originally designed for the Armed Forces, the oil seal puller set removes all sizes of oil seals from ⅜ in. to 4½ in. Special sizes available on order. The set consists of two hammers and six expanding heads which may be purchased separately according to sizes needed or as a complete set in a sturdy tool box. Each expanding head is fully guaranteed by the manufacturer.

Oil seals are removed by first selecting the proper size expanding head. Then the hammer is attached to the head and the expanding head is inserted into the oil seal opening. Next, the hammer is screwed into the expanding head until the head is snug in the oil seal. Then, with a few taps of the hammer, the oil seal is removed without damage to the seat or surrounding material.

For more information circle 128 on Service Coupon this page and mail now.

All-Hydraulic Hydrocrane

A new all-hydraulic H-5 Hydrocrane, developed by Bucyrus-Erie Co., South Milwaukee, Wis., is extremely maneuverable and mobile, and it is claimed it can be used profitably for high lift, close quarter erection; heavy bucket or crane work; big lift, indoor jobs, and precision materials handling assignments.

The H-5 is completely new from outrigger feet to boom tip and is available as a ½-cu. yd. excavator and as a 9-ton lifting crane. It is designed for mounting on a customer's new or used conventional motor truck, eliminating any need for a costly crane carrier. An outstanding feature claimed for the H-5 is its capability, depending on truck selection, to conform with state highway restrictions regulating width, height, axle load limits, etc.

Newest of the Hydrocrane line, the H-5 has an 18,000-lb. maximum lift. It can be equipped with a standard 2-piece boom (telescoping from 24 ft. to 36 ft. long) or with an optional high-lift, 3-piece boom (extendable from 38 ft. to 50 ft. long). The new machine offers such additional features as precision hydraulic control; four patented outriggers which provide more stability, greater leverage without counterweight, and instant leveling; unique gooseneck construction at the boom point; welded steel boom; sturdy, alloy steel revolving frame; simple deck machinery; self-power unit, and easy-to-operate fingertip controls. A remote control unit to operate truck from crane cab is also available as extra equipment. The H-5 Hydrocrane is self-powered. It is equipped with a 75-hp Ford power plant mounted on the upper deck.

H-5 Hydrocrane

For more information circle 129 on Service Coupon this page and mail now.

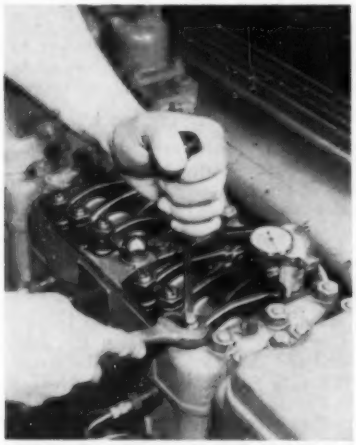
Valve Gappers

Two new P&G valve-gappers, No. 212 and 213, designed specifically for Cummins diesel engines, now make micrometer accurate valve clearance adjustment possible on all popular model Cummins diesel engines, according to the manufacturers, P&G Manufacturing Co., 1604 S.W. 10th Ave., Portland, Ore.

The Model 212 is used on the H and J series Cummins engines and the Model 213 fits all NT and NH series engines.

Both instruments utilize a patented method of measuring the exact valve clearance with a dial indicator which is graduated in .001 in. According to the manufacturer, this method of measuring valve "gap" permits a positive visual reading of the valve clearance before, during and after adjustment, regardless of the wear on the valve stem or rocker arm.

The accompanying illustration of the Model 212 on a Cummins HB engine shows how the mechanic has both hands free to use adjusting tools and can make micrometer accurate adjustments on every valve without depending upon feel. Engine performance is claimed to be improved by this uniform and accurate method of adjustment. There is no difference in the manner of adjustment, only the method of measurement is different.



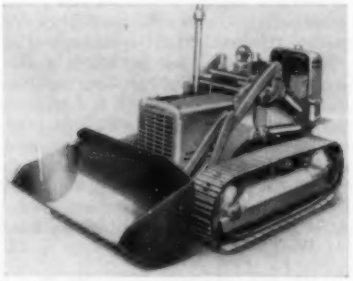
Model 212 on Cummins HB Engine

For more information circle 130 on Service Coupon Page 16 and mail now.

Tractor Shovel

The advantages of integral tractor and shovel design have been incorporated in a new Traxcavator just completed by Caterpillar Tractor Co., Peoria 8, Ill., the Cat No. 955 Traxcavator. Utilizing a 1¼-cu. yd. bucket, the No. 955 is the second Traxcavator to be announced in Caterpillar's expanding line of tractor shovels.

Although many parts of the No. 955 are used on the Cat D4 crawler tractor, the general appearance and location of major items such as the seat are not similar to the standard tractor. The seat location on the No. 955 with respect to the D4 is approximately 11¾ in. higher and 4¾ in. forward, and with respect to the Cat HT4 tractor-shovel, 9½ in. higher and 11¾ in. forward. This improved seat location for shovel work affords excellent operator visibility and comfort.



No. 955 Traxcavator

One of the outstanding features of this new Traxcavator is the tiltback characteristic which enables the operator to tilt the bucket back when it is in any position. The ability to tilt the bucket as much as 40 degrees at the ground line is claimed to offer the following advantages:

Lower cycle time in stockpile loading since bucket can be driven into pile, tilted back, and a full load obtained in one pass without declutching.

In excavating or stripping operations, depth of cut can be controlled with tractor in motion without stalling the engine.

Horizontal tractor push and upward hydraulic thrust can be accomplished simultaneously for better breakout action.

Bucket can be alternately tilted and leveled while pushing to help work its way into the pile.

Heaped loads can be obtained at the ground line or from shallow windrows.

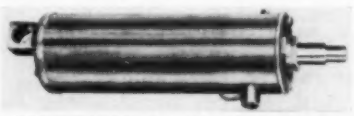
Stability is improved since the center of gravity of the loaded bucket moves back toward the tractor as the bucket is tilted back. The ability to carry the load in a low position keeps the center of gravity closer to the tractor and also provides safe operation when backing up grades by skidding the bucket along the ground.

The No. 955 Traxcavator is equipped with an oil-type flywheel clutch. This exclusive feature provides a clutch that seldom requires adjustment, has an extremely long life and decreases flywheel clutch lever pull. It may be removed without disturbing the engine or transmission. Two reverse speeds up to 264 ft. per minute and four forward speeds up to 607 feet per minute are available. The over-all dimensions of this 70 HP Traxcavator are: length 15 ft. 1¾ in.; width 80 in.; height 82¾ in.; ground clearance 13 7/8 in.; weight 21,480 lb.

For more information circle 131 on Service Coupon Page 16 and mail now.

Large Diameter Hydraulic Cylinders

Wisconsin Hydraulics, Inc., 3165 North 30 Street, Milwaukee 16, Wisc. announces the addition of a new line of hydraulic cylinders in 5-, 6-, 7-, and 8-inch bore size. These are heavy-wall, seamless steel tubing bored and honed to a mirror finish, and cover a range up to 36 tons at working pressures from 1000 to 1500 p.s.i. Heavy-duty cast iron pistons and rings with V-type packing and easily adjusted glands are standard features. Single or double acting, they are available with threaded, plain or pineye rod fittings and cylinder mountings. The cylinders are illustrated and described in Wisconsin Hydraulics' new Folder C-1.



Wisconsin Hydraulic's New Cylinder

For more information circle 132 on Service Coupon Page 16 and mail now.

Aerial Platform Has 65 Ft. Working Height

A new working platform introduced by Pitman Manufacturing Co., 300 West 79th Terrace, Kansas City, Mo., is claimed to have almost unlimited maneuverability at height of 65 ft. Identified as the Model I. G. 65 "Giraffe," Pitman's newest development in the aerial boom field is a king-sized version of the Model I. G. 40 Giraffe, which has a maximum working height of 40 ft. Each features the same basic principals of design and construction.

Model I.G. 65 Giraffe

Model I. G. 65 has a rated capacity of 500 lbs., any radius, any boom position. The boom rotates 360 degrees, continuously, in either direction, and the lower and upper boom sections can be operated either independently or both at the same time.

Designed like a crane, the superstructure of I. G. 65, along with its independent power source and a 1600-lb. counter weight, is mounted on a revolving turntable. The weight of all is thus behind the boom at all times. Hydraulically-operated outriggers at front and rear provide stability.

For more information circle 133 on Service Coupon Page 16 and mail now.

"THIS LUBRICANT KEPT 'EM ROLLING IN MUD, MUCK AND WATER"

—says J. O. ARCHIBALD
of Redwood City, California

The job was clearing 500 acres of salt marsh for crystallizing ponds. To quote, "We selected LUBRIPLATE No. 107 for track and general lubrication and LUBRIPLATE APG-140 for transmissions and final drives. During the entire job there was no replacements of track rollers nor any tie-ups of equipment due to parts replacement or breakage!"

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

. . . for more details circle 224, page 16

Manufacturers' Literature

Bulk Materials Handling with Overhead Traveling Bucket Cranes

To enable users of overhead traveling bucket cranes to obtain maximum cable life and top performance from their clamshells, the Blaw-Knox Co., Pittsburgh, has published an 8-page folder, Form 2510.

The new publication contains excerpts from a paper presented by Arnold Hooper, manager, Bucket Sales, Blaw-Knox, before the American Institute of Electrical Engineers, Materials Handling Conference, in Cleveland this spring. Photographs and diagrams illustrate the relationship between the preferred or required direction of bucket opening; location and contours of the piles of material, and the position of the holding and closing drums in the overhead crane trolley.

The publication is expected to be of particular interest to design engineers and architects who may be building new plants or revamping existing facilities. In a new plant, for maximum cable life and bucket performance, the initial layout arrangement for the storage and handling of materials must co-ordinate the relationship between the flow of material, the direction of bucket opening, and the position of the drums in the crane trolley. The advantages and disadvantages which accrue from proper and improper relationship are illustrated in this folder. Form 2510 is a supplement to the B-K bulletin on maintenance and care of clamshells, No. 2373 R, which may be obtained free of charge by writing Blaw-Knox Co., Box 1198, Pittsburgh 30, Pa.

For more information circle 134 on Service Coupon this page and mail now.

4-Wheel Drive for Chevrolet Trucks

A new 4-page brochure describing the Napco 4-wheel drive for Chevrolet trucks is available from Napco Products Division, 834 North 7th St., Minneapolis 11, Minn. The brochure highlights such features of the Powr-Pak as its inter-changeability from one truck to another; its ease of handling; its installation without damage or distortion to the truck frame; its economy of operation, and the immediate availablility of replacement parts through Chevrolet dealers.

For more information circle 135 on Service Coupon this page and mail now.

Street and Traffic Signs

A 40-page sign manual covering its line of street name signs, directional, traffic, warning, school and railroad signs, posts, brackets, and miscellaneous products has been published by the 40-year old firm of Lyle Signs, Inc., 2720 University Ave., S.E., Minneapolis 14, Minn.

An idea of the comprehensive coverage of the manual is given by the following tabulations:

Type	*No. Signs Pictured*	*No. Pages*
Reflecting Signals	15	2
Standard Stop Signs	6	1
Yield and Dead End Signs	7	1
Speed Signs (regulatory)	8	1
Movement Signs	13	1
Warning Signs	28	2
Parking Signs	20	2
School Zone Signs	14	1
Embossed Signs (Warning)	12	1
Guide Signs	14	1
Destination Signs	6	1
City Entrance Signs	6	1
Parking Signs	9	1
Street Name Signs	25	4
Railroad Signs	6	1

In addition sections are devoted to sign fittings, sign posts, traffic line markers, rubber cones and signs, and tripods and barricades.

"Sign Manual" is a most appropriate name for this publication as it contains illustrations, descriptions and specifications of practically everything in the sign and signal fields.

For more information circle 136 on Service Coupon this page and mail now.

Truck Tracks

All-steel truck tracks claimed to give up to 500% greater flotation are illustrated and described in a circular issued by P & G Supply Co., 2262 N. Albina St., Portland 12, Ore. The tracks can be fitted to almost all standard rear duals on single as well as tandem axle trucks. They are easy to mount and are quickly and easily adjusted to various size tires and road conditions.

For more information circle 137 on Service Coupon this page and mail now.

Bitumen Rubberizers

A 16-page, illustrated brochure telling all about Rubarite, a new rubberized material produced specifically for use in asphalt and tar, has just been printed. Rubarite is made from a combination of unvulcanized synthetic rubber latex and minute particles of barytes, a chemically inert mineral.

Three types of the rubberized material are being produced by the manufacturer, Rubarite, Inc., in Malvern, Ark. The types include a paving grade for bituminous concrete; a mixing grade for rubberizing asphalt prior to its use; and Rubarite Jetlock for rubberizing tar for jet fuel resistant airfield surfaces.

Rubarite, Inc., is jointly owned by The Goodyear Tire & Rubber Co., the National Lead Co., and Bird & Son, Inc. Paving projects using Rubarite have been completed all over the United States and Alaska, in addition to three countries abroad, Venezuela, Switzerland and Sweden. Copies of the brochure are available without charge from Rubarite, Inc., 141 West Jackson Blvd., Chicago 4, Ill.

For more information circle 138 on Service Coupon this page and mail now.

Bituminous Batch Plant

In a recently issued, 8-page, two-color folder, Barber-Greene Co. describes the operational features of their Model 894, 4,000 lb. "BatchOmatic" bituminous batch-plant.

The engineering and design features which make possible each of the seven basic principles in the new batch plant design are graphically illustrated in the new folder. The separate, easy stages of plant erection are shown, including such important details as the instant connection of electrical and hydraulic lines. Construction and operation of the new high-capacity 3½ deck screen with which the 894 is equipped is illustrated and discussed, as are the complete aggregate and asphalt measuring systems, the simple and effective automatic electric control system and the radically different "Dyna-Mix" pugmill.

A copy of the new folder on the 894 "BatchOmatic" plant, as well as a copy of "Bulletin 890" which explains in detail, the principles of the entire Barber-Greene batch plant series, may be obtained by writing directly to the company at 400 No. Highland Ave., Aurora, Ill.

For more information circle 139 on Service Coupon Page 16 and mail now.

Welding Cable Requirements and Data

Uniflex Division, Ypsilanti, Mich., manufacturers of "kickless" resistance welding cables, water-cooled jumpers and secondary welding connectors, have announced a new, 20-page catalog, in which detailed tables are provided to assist in the selection of welding cable in terms of adequate capacity for a given job, current flow and cable lengths. The catalogue also carries tips on reducing welding costs, in addition to a profusely illustrated section devoted to Uniflex products. The catalogue may be obtained by writing to the Uniflex Cable Division of United Metal Craft Company, subsidiary of Gar Wood Industries, Inc., 800 Lowell Street, Ypsilanti, Mich.

For more information circle 140 on Service Coupon Page 16 and mail now.

Brushcutting Saw

The new Model 2 "Brushking" is illustrated and described in a 4-page catalog issued by Brushmaster Saw, Inc., 84 Emerald St., Keene, N.H. It is claimed that one man with a Brushking can do the work of six men with old-fashioned brush-hooks and brush-axes. Model 2 is 5 ft. 10 in. in length and weighs 29½ lb. It has 8 in. or 10 in. diameter saw blades. The peripheral speed is 18,500 s.f.p.m. with standard 10 in. blades.

It is stated that in addition to cutting routine types of brush, Brushking will cut even the hardest woods . . . the most difficult, such as honeysuckle or creeping juniper. It reaches into all hard-to-get-at places, along walls, into ditches, river banks, overhead for limbing and trimming. Facilitates removal of wood by cutting felled wood into shorter lengths.

For more information circle 141 on Service Coupon Page 16 and mail now.

(For more items see page 131)

Here's **TREMENDOUS COMPACTION**

. . . for rapidly and most economically achieving or exceeding specified densities in the consolidation of rock, slag, soil-bound macadam, gravel and sand base courses. Only one pass of the Jackson Vibratory Multiple Compactor is usually required to thoroughly compact a full, standard course. Likewise, in rock and slag when sufficient fines are spread, all voids from top to bottom can be filled chock full with one pass of this machine. Standard width is 13′, 3″; working speeds: Up to 60′ per minute; reverse: Up to 5 MPH.

PAVEMENT WIDENING — LARGE AREA FILLS, ETC.

The Jackson Multiple is also the very finest equipment to be had for compacting the sub-base and base courses in pavement widening projects. By towing the compacting units at the side of the tractor, any granular material used for this purpose can be compacted to specified density in just one pass (compactor bases overlap). Large fills is another area in which this machine really shines. It's fast, thorough and very versatile; gets into places other machines can't reach. And for the really tight spots one or more of the compacting units may be detached, fitted with operating handle and used as a standard Jackson Manually Guided Compactor (self-propelling). By all means see this extremely advantageous equipment at your nearby Jackson distributor who has it both for rent and for sale. Distributor's name and literature on request.

The MULTIPLE on base course of a widening job 36" wide, 9" thick. One of the compacting units fitted with operating handle and used individually.

JACKSON VIBRATORS, INC.
LUDINGTON, MICH.

. . . for more details circle 256, page 16

Suggested Methods of Causing "Fusion" of Hydrogen Atoms

By Halbert P. Gillette
President and Publisher
Gillette Publishing Company

THE stupendous energy of the hydrogen bomb is emitted so explosively that some different method must be devised if the "fusion" of hydrogen atoms is to become applicable as a source of industrial power. If such "fusion" is the result of magnetic attraction of atoms, as suggested by the writer in the July issue of ROADS AND STREETS, then it may possibly be effected by great hydrostatic pressure.

In that article attention was called to the fact that Prof. P. W. Bridgeman had unintentionally effected the formation of certain molecules merely by submitting them to great hydrostatic pressure. His maximum pressure was of the order of 6,000,000 pounds per square inch. The writer infers that the heat waves emitted by the pressure causes orientation of atomic magnetons so that their planes become approximately parallel. Then the paired, orbital electrons and positrons of the magnetons are attracted magnetically with sufficient force to effect a molecular union. By analogy, hydrogen atoms may behave in a similar way, producing grosser atoms.

It seems to the writer that the hydrogen bomb is exploded in that fashion by the orientation of the orbital planes of magnetons toward parallelism by the radiant waves emitted by the disrupting atomic bomb that is the detonator.

Possibly a number of small detonators can be successively discharged among atoms of slight atomic weight so as to effect their "fusion" without destroying their container.

The magneton theory of atomic attraction, as outlined in the July issue, substitutes magnetic for electrical force hitherto regarded as the sole cause of chemical attraction.

In the Transactions of the American Institute of Mining and Metallurgical Engineers, 1904, pages 702-710, there is a paper by the present writer on Investigations in Thermal Chemistry Showing Atomic Heat-valency. Discussion of the paper occurs in a later issue p. 986-988. The writer said: "In this paper I show that each chemical element (here discussed) and each chemical radical has its own definite heat-valency, a fact which, so far as I know, has escaped the attention of investigators." In the table that followed, each of 20 atoms and 7 radicals was assigned its quota of heat of formation when a chemical union occurs. No theory of this phenomenon was given. It cannot be explained by the electrical attraction theory of the formation of molecules, but it accords with the writer's magneton theory.

The Rutherford theory of the structure of atoms calls for a positively charged core (proton) of the hydrogen atom, consisting of the entire mass of H less one negative electron that travels orbitally around the core. The discovery of the positron by C. D. Anderson in 1932 could not be explained by Rutherford's theory, for the positron is a positively charged corpuscle having the mass of the negative electron. But the positron was only the beginning of trouble for the Rutherford theory, for it was followed by the discovery of several positive mesons whose mass is only a fraction of that of the proton, e.g. about 1/9 and 1/6 thereof.

Rutherford was no more fortunate in his theory that the fission of uranium occurs at a constant rate. He inferred that nothing could alter that rate, but was wrong, as the invention of the atomic fission bomb spectacularly showed in 1945.

The first published evidence of Rutherford's error was in an article by Prof. L. D. Stamp on Seasonal Rhythm in the Tertiary Sediments of Burma (Geol. Mag., 1925, vol. 62, pp. 515-528). There he challenged the Rutherford formula by which the ratio of the weights of lead and uranium in rock was used to estimate its age. By measuring many varves (annual laminae) he found an average of 174 to the foot of rock, from which he estimated that the Miocene Period lasted about 1,700,000 years at the most, or only a fraction of the time given by the uranium-lead formula. Stamp's conclusions were confirmed by the writer by measuring rock varves in many major Systems of 24 of our states and in Mexico, from which it was evident that a System, deposited in a geological Period, was deposited in about 1,500,000 years. From this it follows that the oldest stratified rocks are about 1/50 as old as indicated by the uranium-lead formula. Evidently there exists in Nature reactors that speed up the fission of uranium!

In his Electricity and Matter (1904) Sir J. J. Thompson adopted the then 90-year old theory that "the forces which bind together the atoms in the molecules of chemical compounds are electrical in their origin." But he added that: "Chemists in general seem, however, to have made but little use of this idea, having apparently found the conception of bonds of affinity more fruitful . . . It may be urged that although we can conceive that one atom in a compound should be positively and the other negatively electrified when the atoms are of different kinds, it is not easy to do so when the atoms are of the same kind, as they are in the molecules of the elementary gases."

But as the writer sees it, the magneton theory of atomic structure gives a simple explanation of the phenomenon called chemical bonding. That theory was not devised either to explain such bonding, or several other phenomena that it explains. Its multi-explanatory power is itself good evidence of its soundness. In his Philosophy of Discovery (p. 274), William Whewell said (1856): "There is another kind of evidence of theories, very closely approaching the verification of untried predictions . . . I have spoken, in the Philosophy, of the Concilience of Inductions as one of the Tests of Hypotheses, and have exemplified it by many instances."

● L. J. Houston, Jr., 74 year old dean of the nation's city managers, will retire from that position in the city of Fredericksburg, Virginia, in October, after 37 years of continuous service as city manager. Fredericksburg was the second city to inaugurate city managership in Virginia, in 1912.

Products for Pipeline Protection

A new, 16-page, illustrated booklet describing applications and giving property data on "Scotch" brand products for pipeline protection has been announced by Minnesota Mining and Manufacturing Co., Dept. E5-229, 900 Fauquier St., St. Paul 6, Minn.

The two-color booklet covers the use of "Scotchrap" brand all-weather pipe wrap tapes Nos. 50 and 51, "Scotchrap" brand pipe primer, and "Scotch" brand filament No. 45 which is used for attaching rock shields to buried pipe. In addition it covers "Scotchfil" electrical insulation putty, "Scotch" brand No. 33 plastic tape, and "Scotchkote" electrical coating for use in protection of splices in anode ground bed installations where resistance to moisture, fungus and mechanical abrasion is required. Charts showing complete physical and electrical insulating properties for each of the products are included and a wide range of typical pipeline applications are pictured in addition to a brief discussion.

For more information circle 147 on Service Coupon this page and mail now.

Excavating and Materials Handling Machines

A new, colorful 40-page bulletin (403-C) on its complete line of excavating and materials handling machines is available from the Marion Power Shovel Co., Marion, O. Bulletin 403-C features action photos of each basic machine type and condensed specifications. A special section tells of Marion's role in power shovel history and lists developments first pioneered by the company.

Marion offers a complete line of power shovels, draglines and cranes ranging from ¾ cu. yd. capacity to the largest excavating machines the world has ever known. One page of the bulletin is devoted to the 60-yd. Marion 5760 coal stripper, the world's largest shovel.

For more information circle 148 on Service Coupon this page and mail now.

Trenching Machine

A 2-page circular on its trenches is available from Construction Products Sales, 4043 Goodwin Ave., Los Angeles 39, Calif. This trencher is powered by a new overhead-valve sleeve engine. It digs trench 12 in. to 24 in. wide to 60 in. deep at speeds 2 ft. to 20 ft. per minute. Important features of the machine are illustrated and described.

For more information circle 149 on Service Coupon this page and mail now.

Tractor and Scraper Operation

A unit that moves more material at less cost per yard or ton on many types of jobs and under difficult conditions is described in a booklet (Form No. DE-509) "Low Cost Producers" published by Caterpillar Tractor Co., Peoria 8, Ill.

In this booklet, four-wheeled tractors equipped with scrapers and wagons are shown giving faster loading, better hauling, and controlled dumping on a variety of jobs throughout the world. Owners of these units tell how they get top performance no matter how large the load or what the material.

For more information circle 150 on Service Coupon this page and mail now.

Low Cost Earthmover

What makes an earthmoving unit give consistently high production at low operating cost? This and other questions about a low cost unit are answered in a booklet (Form No. DE514) titled "DW21 Low Cost Earthmover" published by Caterpillar Tractor Co., Peoria 8, Ill.

The new booklet contains contractors' reports on their experience with a unit that gives them low cost per yard over the entire life of the machine. Six contractors moving all kinds of material on various jobs tell why they're operating at a profit.

For more information circle 151 on Service Coupon this page and mail now.

Diesel Electric Sets

The new line of small size, high capacity Caterpillar diesel electric sets are described in "Modern Electric Power", (Form 31649) published by Caterpillar Tractor Co., Peoria 8, Ill.

In four illustrated pages, this booklet describes the advantages of these rugged sets, matched to their Cat engines to provide maximum efficiency.

For more information circle 152 on Service Coupon this page and mail now.

PREVENTS STRIPPING

FACILITATES WET-MIXING

INSURES FAST ADSORPTION

IMPROVES AGGREGATE UTILITY

DEHYDRO®

Asphalt Anti-Stripping Additive

A Tretolite Company Product

Dehydro Asphalt Anti-Stripping Additive is a liquid organic material with excellent heat stability characteristics. It facilitates the formation of a firm bond between asphalt and aggregate in the presence of moisture.

Dehydro Additive is easily handled at ordinary air temperatures. It is heat stable and has a low pour point. It is readily mixed with asphalt, either at the refinery or on the job.

Dehydro Additive is stocked at St. Louis and Los Angeles and is always available for immediate shipment. Shipment can be made in drums or by tank car.

The photo above shows how Dehydro Additive prevents stripping. Two samples of the same aggregate were coated with asphalt and allowed to cure for twenty-four hours. They were then placed in water at room temperature. In the left-hand container, where no additive was used in the asphalt, stripping took place in a few hours, while the right-hand sample in which Dehydro Additive was used, retained its coating.

For complete information, write or call

TRETOLITE COMPANY

A DIVISION OF PETROLITE CORPORATION

369 Marshall Avenue, St. Louis 19, Missouri

5515 Telegraph Road, Los Angeles 22, California

AA 5523

. . . for more details circle 242, page 16

BITUMINOUS DISTRIBUTOR
Front or rear mounted for truck or trailer . . . with pressure metering.

MAINTENANCE UNIT
Heating and spraying unit . . . 2-wheel or truck mounted.

SUPPLY TANK
Truck or semi-trailer mounted . . . single or tandem axle.

ROSCO-PACTOR
9 or 13 wheel roller . . . 90 to 125 cubic foot capacity.

ASPHALT KETTLE
2-wheel pneumatic mounted . . . hand or power spray.

a partial showing of the complete

ROSCO LINE

of construction and maintenance equipment for

- HIGHWAYS
- STREETS
- AIRPORTS

Send for "Complete Line" bulletin 54-4.

ROAD SWEEPER
Two way . . . power driven . . . full 4-wheel trailer mounted.

STREET FLUSHER
Truck mounted as shown or 2-wheel model for towing.

ROSCO STREET CLEANER
Model MBC

Power driven . . . for sweeping or flushing . . . wet or dry. Send for "Complete Line" bulletin 54-4.

ROSCO MINNEAPOLIS

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MAINTAINERS

BROOMS

SUPPLY TANKS

TAR KETTLES

STREET FLUSHERS

Rosco Mfg. Co. • 3118 Snelling Ave. • Minneapolis 6, Minn.

. . . for more details circle 232, page 16

(Continued from page 115)

the finished mix on a per-ton basis. No matter how alluring the improvements provided, the merits of rubber as an additive can only be established by a demonstrated economy per mile to construct rubber-contained pavements, as compared to the very satisfactory one we know we can build from asphalt alone.

Admittedly there are many steps to be taken before such figures can be reliably obtained. In this interim period those doing such a good job in this field must be given encouragement and support and must be helped to reach this point of an economic evaluation. At the same time rubberized pavements cannot be generally justified just because some laboratory tests show that rubber gives asphalt greater extensibility, that the rubber-asphalt mixture has superior cold weather characteristics, and similar. These properties are all desirable in indicating there are merits from the use of the additive, and should lead to a better pavement.

Nevertheless, until the economic superiority of such surfacings has been demonstrated, there is limited justification for wide adoption of this type of construction. If the energy available today for selling rubber pavements is directed towards this end, we should soon have an answer, which everyone hopes will be a lower over-all cost for maximum pavement quality which is now obtainable with asphalt alone.

There are of course other criteria which can be applied to representations concerning new products or methods; they may be summed up by the statement that any discussion which does not seem to lead to the conclusion outlined above is superfluous and should not be given too much weight. If new improvements are judged in this critical fashion, it will be a great boon to the highway engineering profession. It is our belief that the men responsible for expenditures — the administrators who must find the money, the engineers who must design and construct the pavements, the consultants who are asked to pass on the policies involved — all want to take advantage of the many new possibilities resulting from our tremendous scientific expansion. The meritorious promotions suffer when the time of these men is taken in discussion which does not lead to specific figures or other definite conclusions.

Careful Scrutiny Needed

A good businessman does not mind when the bank cashier carefully scrutinizes the check he presents; he knows

the bank will not be safe for his funds if this sort of action is not taken. In the same way, those who wish to see highways progress must be equally critical of (yet attentive to) new offerings. In doing so they will not discourage those which appear to have merit but are presented prematurely, merely pointing out the need for more data.

Promoters and salesmen have the same stake, will benefit equally from this handling, because successful new ideas furnish an encouraging climate for other proposals. Common sense, discrimination, and reduction of sales talk to facts and figures which have bearing on our basic problem are essential.

We should never lose sight of the fact that this basic problem is to give the public more of the transportation facilities so badly needed today from the definitely limited sums available therefor. That is our job as engineers, whether with the governmental units, the contractors, or the suppliers.

New York Thruway revenue continues to climb

Students of toll road planning will be interested in the steady growth of traffic, following a discouraging beginning on the New York State Thruway. This road which now has nearly 400 miles open to traffic between Buffalo and the New York City area, carried 7,050,000 vehicle trips during the first seven months of 1955.

The point of greatest significance is the steady growth of patronage by truckers. Commercial revenues rose in July for the 13th consecutive month, totalling $1,867,893 for the seven months. Total revenue for the period was $6,965,000.

The mileage immediately out of New York City is being rushed to completion, which, together with other linkage planned will insure a continued rise in revenues for this big road.

● New military bridge trailer in action.

Army Engineers design bridge launching trailer

A special trailer has been developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va., to transport and launch a complete bay of the Army's new division floating bridge.

Towed by a standard 5-ton bridge truck, it features a tilting bed with rollers which facilitate the launching of an assembled bay into the water. New erection speed and elimination of a crane are accomplished.

The rollers can be locked to prevent rotation while transporting a "ready" bay, and retracted to provide a flat bed for an unassembled bay of bridge. After the bay slides into the water, a power boat is used to retrieve it and maneuver it into position. Boats can also be hauled and launched by the trailer.

Construction of complete bays on trailers in a rear assembly area eliminate the need for a crane at the site and speeds erection at rates never before approached with the bridge.

Vehicle registration climbing

An index of the continuing growth in traffic volume is the gain in motor vehicle registrations throughout the nation. Registrations will exceed 61,300,000 in 1955, according to estimates by the Bureau of Public Roads. This represents a 5.1 percent increase in passenger cars over 1954, and a 2.8 percent gain in trucks and buses, and a 4.6 percent over-all gain.

Registrations have gained yearly as follows:

1951	5.6 percent
1952	2.6 percent
1953	5.7 percent
1954	4.1 percent
1955 (estimated)	4.6 percent

A forecast of 81,000,000 registrations by 1965 is made by the Bureau.

SWENSON SPREADERS
FOR ICE CONTROL

SPREADS SALT 200 LBS. PER MILE OR IN ANY DESIRED AMOUNT
Lays a Narrow Strip or Full Traffic Lane

Handles all granular materials — salt, cinders, sand, calcium chloride, rock chips. Spreads at speeds up to 30 M.P.H. Clutch-controlled flow: steady or intermittent for hills and intersections.

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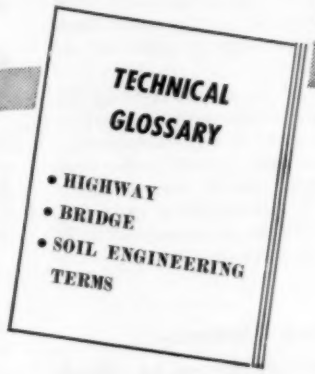

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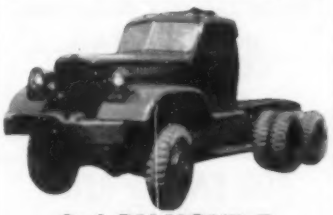

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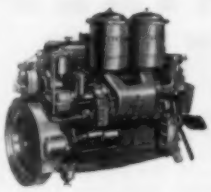

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Power Units - Model 12104 - Serial Nos. 12A-1961, 12A-1962, 12A-1930.

Radiator Cooled — Heavy Duty Intake Air Cleaners — Heavy Duty Drive — 1-77 to 1 Power Transfer Reduction Gear — "60" Injectors — 24-Volt Starting Motor — Instrument Panel — Standard Equipment — 24" 10 Groove V-Belt Sheave — Disconnect Clutches — Exhaust Snubbers — Adjustable Slide Rails —

These Units Were Installed, Tested, and the Pumps They Were to Drive Never Installed

WE GUARANTEE THEM TO BE COMPLETE AS ADVERTISED HEREIN

Today's New Price F.O.B. Detroit — $9820.00 each

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These Units Can Be Furnished as 200 K.W., A.C. or D.C. Generators. Inquire for Price

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170-B Bucyrus-Erie Electric 6-yd. Shovel, 54-ft. boom, 40-ft. sticks. New late 1949 — like new.

1600 P&H Electric Shovel, 34-ft. boom, 22-ft. sticks, 6-yd. dipper. New 1948. Excellent condition.

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2—520 Gar Wood Scrapers, wagon struck, 20 yds. heaped.

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P.O. Box 325 — Hazleton, Pa.
GLadstone 5-4708

FOR SALE

MANITOWOC Model 3500 High-lift Shovel, 2 yd. capacity, Caterpillar D-17000 engine. Dragline boom available.

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WORTHINGTON 500 c.f.m. Portable Compressor, Cat diesel engine, four pneumatic tires. Very good condition.

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9:00x20 tire, tube and 6 hole Budd wheel, with 50 to 90% tread, $20 each; tire and tube only, same price. If tires are not pleasing, you may return them. 11:00x18 tire, tube and wheel, $20 each; 9:00x16 tires, $15.

RECONDITIONED

65 6x6 G.M.C. trucks	$1500
125 6x6 Dodge, 1½ ton trucks	595
4x4 Chev. cargo, body and winch	750
4x4 Chev. tractors	350
4x4 Dodge weapons carriers	545
4x4 Autocar, 5 ton trucks	1000
4x4 Federals, 5 ton trucks	1000
100 4x2 Ford, cab and chassis	300
4x4 Scout cars with 9:00x20 combats	800
47 Passenger Diesel Yellow Coach, perfect condition, like new	3500
G.M.C. amphibious trucks (Dukw)	700
2000 gallon tank trailer	650
30 foot flat trailer	1000
28 foot tandem van trailer	1500
28 foot vans	900
C-2 Wrecker on Federal truck	5000
100 Lowboy Bomb trailers	200
Boom Assy. w/winch for Holmes Wrecker, capacity 4000 pounds. Price each	600

We have parts for above vehicles. Tarps, 17x40, $50 each; tarps, 17x20, $25 each, like new. New C. H. Fink snow plow, model 349SP; large and small fork lifts; large and small winches; 40 generator sets, 4 cyl. gas engine, 15kW DC, 28.5 Volt, 2 wire, 2400 RPM, portable, Model C-16.

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25% WITH ORDER—BALANCE C.O.D.

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133 H.P. Motor, 6 yard GarWood metal bed with 7 inch Hoist; Directional Signals, Radio and Heater. Five forward Transmission with 2 speed axle. Practically new nylon tires, low mileage, absolutely like new.

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McMINNVILLE, TENNESSEE

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See These Bargains Now While They Last

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IHC TD-6 with B-E dozer shovel
IHC TD-18A with cable dozer and winch.
IHC TD-18 with or without dozer.
IHC TD-14A with or without hydraulic dozer.
IHC TD-9 with hydraulic dozer.
Cat D4 with Traxcavator loader.
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Austin-Western 99M motor grader.
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LOCATED AT DULUTH

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IHC TD-14 with hydraulic angle dozer.
IHC TD-6 with or without dozer.
Cat D2 and D4 with hydraulic angle dozer.
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LOCATED AT CROOKSTON

IHC TD-18 tractor.
IHC TD-6 with hydraulic dozer.
IHC TD-24 with cable dozer and winch including Bucyrus-Erie B-170A Scraper.
Cat #11 motor grader with V and wing

Miscellaneous wheel tractors with loaders, screens, compressors, water pumps and power units.

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AT BARGAIN PRICES

1—P&H 1400 DE 5-yard Shovel
1—NW 80D 2½ yard Shovel
1—Insley K12 ½ yard Backhoe
1—Insley K12 ½ yard Crane
1—9BV Euclid Loader
5—43FDT Euclid bottom dumps 15 yard capacity
1—HD19 Allis Chalmers Tractor equipped with dozer and PCU
1—Chicago Pneumatic 315CFM Diesel Compressor
1—Gardner Denver 210 CFM Diesel Compressor
1—Davey 210 CFM Gas Comp.
1—Davey 105 CFM Gas Comp.
1—Ingersoll Rand 105 CFM Gas Compressor
2—International LF192 6-wheel Dump Trucks
1—HL70 Sullivan Tunnel Mucker 24" Gauge

ALL IN GOOD CONDITION

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One Shovel Attachment for Northwest 25 — Almost New.

One Lorain Model 41 Equipped With 40' Dragline Boom. Good Operating Condition — Serial No. 18514.

One Austin-Western 88H — Serial No. 88-730, Completely Rebuilt.

One Austin-Western 99H — Serial No. 2378, Completely Rebuilt, New Tires.

One Link-Belt Speeder Model VC-55, Self Propelled Truck Crane — Like New — Serial No. 2-CV132.

One International ID9 — Serial No. DCB-8529, Completely Rebuilt.

One LeRoi Tractair Model 125G2E — Serial No. 203X2989, Good Running Condition.

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84x66 jaw crusher — 30" and 36" Sup. McCully gyratories — Cedar Rapids jr. port. washing plant — Cedar Rapids port. 2025 primary with feeder, conveyor $11,000 — Austin 7½ gyratory — 6x22 Allis Chalmers compeb mills — 84"x28' Eagle double screw classifier — 8x123 rotary dryer — 7x110 kilns — 6x74 rotary coolers — 44 ton diesel electric locomotive $19,800 — 85 ton G.E. trolley locomotives — 1600 hp Fairbanks Morse direct reversible marine diesel engine $22,000 — 30 ton outside overhead electric traveling crane 65' span —American revolver model R-10 55,000 lbs. at 25' radius — 30 ton diesel locomotive crane — Koehring 601 combination $14,000 — 120 B combination $60,000 — 3½ yd. Monighan walker $44,000 — N.W. 8 dragline $11,500 — N.W. 95 dragline $16,500 — 120 B electric dragline $57,800 — P & H 855 dragline $25,500 — Link Belt K 595 dragline $40,000 — Marion 111 M dragline $68,250 — N.W. 80 D shovel $24,500.

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Box 97 Phone 500
CROSBY, MINNESOTA

EQUIPMENT PRICED FOR QUICK SALE

1—Buckeye Hi-Way Widener Model 616-45 with 24", 30", 36" and 48" buckets, G.M. Diesel Engine Model 371, 1½ years old.

1—Austin-Western Grader Model 99-H, Serial No. H3584, International Diesel Engine Model UD 14A. Serial 28179, fully equipped.

BLACK TOP PAVING CO.
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2—AUSTIN WESTERN Model 99-H Diesel, current production. Completely reconditioned, new tires, cab, heater, lights. New machine guarantee. Inspection invited.
Price, each $7,950.00

1—CATERPILLAR Model 10, Gasoline engine powered. Ideal for low cost maintenance work.
Price $1,650.00

STRAITS ENGINEERING COMPANY
Upper Peninsula Austin-Western Distributor
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M-47's, M-49's, T-35's.
Some only 1½ years Old.
Dragline, Backhoes, Clamshells, Cranes.
All are priced to sell. Can finance for two years at low bank rate to responsible contractors.
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750-20 Army Tread Good Condition.. 12.95
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Write for prices and sizes not listed. Send check or money order or 25%, balance C.O.D. Freight Collect.

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Everyone Saves at BARONS
All types of heavy work tires. Excellent condition.

750-20 8-ply Army Surplus Full Tread

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Terrific Value
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Trencher – Parsons No. 221 – 16″ Buckets & Side Cutters – 8 ft. Maximum Depth – Diesel Power.

Loaders – Diesel Tractor Mounted – Front or Overhead Hydraulic Dump.

Tandem Rollers – 5-8 Ton – 8-12 Ton – Hydraulic Steering.

Hoisting Towers, Steel – Hoists – 35 to 100 H.P., Guaranteed Condition – Available Now.

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1 P.&H. 855 lifting crane, long crawlers, 90′ boom, fairleads and dragline bucket. Crane recently reconstructed to 955 lines. Excellent condition. F.O.B. New Carlisle, Indiana. Guar. Lease for 12 months or Cash $35,000.00

2 1954 Euclid rubber-tired scrapers, 15.5 cu. yd., Cummins diesel, 275 h.p., used only 1000 hours. F.O.B. New Carlisle, Indiana. Each $27,500.00

1 Michigan ½-yd. Crane with attachments: ½-yd. backhoe; ⅝-yd. drag bucket and fairlead. Wide tracks. Excellent condition. F.O.B. New Carlisle, Indiana $9,750.00

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Phone: 2-4451

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NEW Blaw Knox T63B twin batchers with scales for Blaw Knox P-3100 or other aggregate bin.
Cedar Rapids 3000 lb. asphalt plant, complete.
Jaeger 20′–25′ concrete finisher & spreader.
Barber-Greene model 879A asphalt finisher.
3—Koehring 34E diesel dual drum pavers, late models.
Galion 3-5 ton portable tandem roller.
2—Buffalo-Springfield 5-8 ton tandem rollers.
Galion 10-12 ton diesel tandem roller.
Blaw Knox 10′-15′ finisher & spreader.
Johnson fully automatic concrete plant with 300 yard aggregate bin and all equipment for complete plant.
Jaeger-Lakewood concrete finisher for 18′ & 22′ pavement.
Heltzel 105 ton 3 comp. aggregate bin.
9,000′ Blaw Knox 10″ x 10″ road forms.
4,000′ Blaw Knox 8″ x 8″ road forms.
8,000′ Heltzel 12″ x 18″ reversible airport forms.
2,300′ Blaw Knox 9″ x 9″ road forms.

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Universal 2036 Primary
CRUSHING PLANTS

Mounted on steel wheels, 24″x31′ under crusher conveyors — all with MM gas engines. All new — unused surplus — Just received. Ready for shipment.

Subject to prior sale.

Price $12,500 each f.o.b. cars or truck, San Francisco

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Market 1-5740

USED EQUIPMENT

2—Cat D7 Crawler Tractors with dozers, 3T Series.
2—Cat D6 Crawler Tractors with and without dozers, 9U Series.
2—Cat #12 Motor Graders, 9K Series.
2—IHC TD18A Crawler Tractors, Serial #28377 and 28169.
AC HD19 Crawler Tractor, 1949.
10—GMC, 1953 Tandem Diesel Dump Trucks with 8 cu. yd. bodies.
P & H Model 335 Dragline, ¾ yd. Diesel Engine.
Cedarapids Secondary Crusher plant, CCC 40-24 and Diesel Power Unit.
CATERPILLAR DEALER
BUTLER MACHINERY COMPANY
Fargo N. Dak. Grand Forks

AIR AND ELECTRIC PORTABLE TOOLS
Large Savings on New and Rebuilt
• Pavement Breakers • Clay Spades
• Sheeting Drivers • Impact Wrenches
• Drills • Grinders • Rivetors • Rock Drills
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Send for our "Bargain List of Guaranteed Tools"
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60 in.	8.80
90 in.	8.65
120 in.	8.50
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360 in.	8.00

COPY AND CLOSING DATES

Final closing date is the Fifteenth of the preceding month. Magazine is issued 1st of publication month. If proof desired, copy must be received 5 days preceding closing date.

NOW! Get Circulation Where It Counts . . .

Roads and Streets' Clearing House REACHES THE MARKET'S HEART

INDIVIDUAL CONTRACTORS
CITY, COUNTY ENGINEERS
CITY, COUNTY OFFICIALS

With the Manufacturers and Distributors

TerraTrac Tractorama

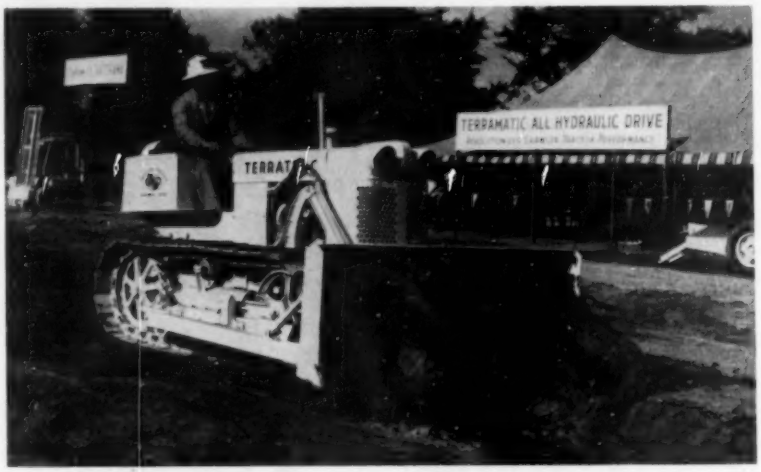
Two of the most revolutionary developments on the low-priced American Tractor Company's line of TerraTrac crawler tractors — a new all-hydraulic instant-shift transmission and a torque converter drive — were demonstrated to representatives of the industrial press on August 15, 1955, at Churubusco, Indiana, home of the company. In the all-afternoon Tractorama Preview, the Models 200, 300, 400, 500, and 600 tractors, variously equipped with Terramatic transmission alone and with torque convertor in conjunction, demonstrated bulldozing, trenching, and loading. One spectacular exhibit was that of an M-3 fork-equipped high-lift unit raising 1500 lbs. of concrete blocks on a pallet and placing the loaded pallet on a scaffold platform 21 ft. in the air.

To the writer, the Terramatic transmission was the most outstanding component of the tractor. The secret of this transmission is a unique constant mesh gear train combined with hydraulically operated clutches which are bronze on steel plates running in oil. The clutch plates are contained in a drum and are squeezed together by a flat piston under hydraulic pressure having a cylindrical neoprine insert or gasket as a seal to maintain pressure against leakage. No shifting of gears being required, this transmission provides instant reversal of direction by merely the flick of a lever or levers that actuate hydraulic valves. It provides 4 speeds forward up to 6.2 mph.

Turns can be made by power on both crawler treads or by braking one tread (with hydraulic foot brake) while power is on the other tread to make a pivot turn.

The advantages of torque converter drive in adjusting load to speed is well known. TerraTrac is currently featuring four new crawler models with a single-stage converter, engineered for these tractors. The largest model in the line, the 600, develops up to 19,000 lbs. drawbar pull according to the manufacturer.

One demonstration, besides bulldozing,



● The new TerraTrac 600 with Terramatic transmission and torque converter drive in bulldozing demonstration to the press.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?

Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

Don't Let This Happen to You

Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *You* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have *all* this information. *Please print or type.*

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☐ I do receive ROADS & STREETS and wish to continue to receive it.
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NAME

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CITY (If you have moved give *old and new* address) ZONE (if any) STATE

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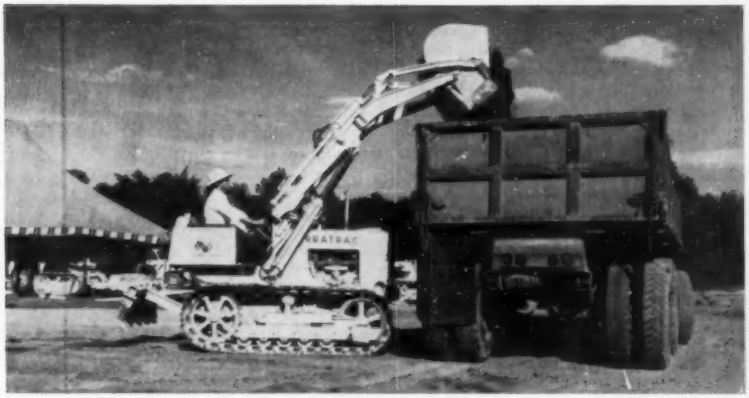


● A clear dumping height of over 9 ft. enables the new 1-cu. yd. Model 600 Terraloader to load high sided trucks. Note the method of pivoting the bucket at the front corners.

digging a trench with a bulldozer, and loading with their front end loader was that of trenching with rear-end attached Pippin hydraulically operated pull-shovel.

Specifications on the various models were furnished to the press and can be obtained by writing to the American Tractor Company, Churubusco, Indiana.

LE ROI NAMES BUTTNER MANAGER OF ENGINEERING — H. J. Buttner has been appointed manager of engineering for the LeRoi Division of Westinghouse Air Brake Co., Milwaukee, Wis. The announcement was made by Paul I. Birchard, vice-president and general manager of Le Roi manufacturers of internal combustion engines, portable and stationary air compressors, Tractairs, and air tools. Mr. Buttner has had nearly 25 years of engineering experience in the design and development of high output internal combustion engines, including all phases of research, development and testing. He has held engineering management positions with the Continental Motor Corp., the Allison Division of General Motors and the Packard Motor Car Co. He was on the Purdue University faculty from 1946 to 1952.

TIMKIN CO. PROMOTED THREE — E. H. Hughes, manager of the Sales Order Department, The Timkin Roller Bearing Co., Canton, O. has been named to the newly created post of assistant to the sales director, J. L. Brown and Don M. Brown have been appointed assistant manager of the Sales Order Department and manager of the Allocations Department respectively.

GILRONAN MOVES UP WITH HELTZEL AND FLEXIBLE — William V. Gilronan was recently named Sales Manager of the Flexible Road Joint Machine Co., associate of the Heltzel Steel Form & Iron Co., Warren, Ohio. In addition to directing the sales of Flexible's Flex-Plane line of road equipment, Mr. Gilronan will also assume the duties of advertising manager for both Flexible and the parent company.

LOVEALL APPOINTED VICE PRESIDENT — Tony Loveall, for the past two years in the field force of Construction Machinery Companies, returned to the home office in Waterloo, Ia., Sept. 1 to assume new duties as vice-president and general manager of Construction Machinery Sales Co.

TECO ADDS ROWLAND GARRATT TO TECHNICAL STAFF — Rowland M. Garrat, 28, graduate engineer of the Massachusetts Institute of Technology, has joined the laboratory organization of Timber Engineering Co., 1319 Eighteenth St., N. W., Washington 6, D. C., research affiliate of the National Lumber Manufacturers Association, according to Carl A. Rishell, director of research. Mr. Garratt comes to Teco from Gamble Brothers, Inc., of Louisville, Ky., where he was lumber and wood products development engineer.

HUTCHISON APPOINTED SUPERVISOR PRODUCTION ENGINEERING — George B. Hutchinson has been appointed supervisor of production engineering for Armco Drainage & Metal Products, Inc., Middletown, O. In his new position, Hutchinson will coordinate production methods and procedures for all Armco Drainage plants and will direct the experimental phases of the production of new Armco Drainage products.

NEW SALES REPRESENTATIVE FOR MULTI-MATIC — Leo J. Schulte & Co., 362 Bailey Ave., Pittsburgh, Pa., has been appointed sales representative in western Pennsylvania for Multi-Matic Corporation, Van Nuys, Calif.

FOUR EXECUTIVE APPOINTMENTS IN ARMCO — Four executive appointments in Armco Drainage & Metal Products, Inc., Middletown, O., have been announced by S. R. Ives, President of the Armco Steel Corporation subsidiary. William O. Robertson has been named vice president in charge of sales for the company. He has been vice president and manager of the eastern division of the company. Tom M. Neibling, former vice-president and manager of the com-

Ask the man behind the gun . . .

White gives you everything you want in an engineer's transit

Shown, model 7014 with "A" standard. "U" type also available. $675.00* complete with tripod case and field equipment.

WHY are more and more engineers and builders choosing White Engineers' Transits? Basically, the reason is simple: White transits are designed and built for the man in the field. They incorporate all the work-saving, accuracy-boosting features . . . the rugged construction . . . the simplified quality components that you want. In addition, you get coated optics, covered leveling screws and internal focusing Telescope. Wide frame tripod is optional.

YOUR CHOICE OF THREE RETICLES AS SHOWN BELOW —

Fig. I Cross hair arrangement for our standard levels

Fig. II Stadia hair arrangement for our standard transits.

Fig. III Special stadia hair arrangement, furnished upon request.

To get the details on the complete White line of instruments for Engineers, Surveyors and Builders, write for Bulletin 1053. DAVID WHITE COMPANY, 325 W. Court Street, Milwaukee 12, Wisconsin.

DAVID WHITE COMPANY

We offer the most expert REPAIR SERVICE on all makes, all types of instruments

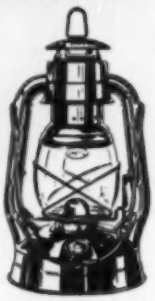
*Prices subject to change without notice.

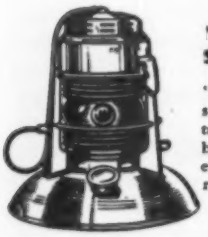
. . . for more details circle 246, page 16

DIETZ
LANTERNS
& TORCHES

DIETZ TUBULAR LANTERNS

A complete line of economical long burning kerosene lanterns available with Ruby, Clear, Blue, Green Amber Globes. Dependable, rugged quality backed by the oldest and largest manufacturer of Portable Light.



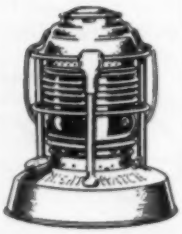


DIETZ-EMBURY "TRAFFIC-GARD" SAFETY LANTERN

"Magnified-Beam" seen for great distances. Wide, non-tip base. Long burning, economical. Stands rough usage.

DIETZ "NIGHT WATCH" SAFETY LANTERN

A miniature beacon—with new "Pencil Beam"—visible from any direction, near and far. Longest burning—over 100 hours on a pint of kerosene.



DIETZ HIGHWAY TORCHES

Complete line of bomb and flat base, Dietz *Blue* threaded collar burner models, and Dietz-Embury *Red* cam lock burner models. Tops in rugged quality.

DIETZ LANTERNS
SINCE 1840

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R. E. DIETZ COMPANY
EST. SYRACUSE 1, N. Y. 1840

. . . for more details circle 196, page 16

pany's southwestern division, has assumed the same position in the eastern division. W. W. Mains, vice president and manager of the Missouri-Kansas division in the past, has been appointed vice president and manager of the southwestern division of the company. A. J. Mistler has been named division manager of the Missouri-Kansas division. He has been division sales manager.

PUTZ NEW AD-MANAGER BARBER-GREENE — W. E. "Ned" Putz has been appointed advertising manager of Barber-Greene Co., Aurora, Ill. He joined the publicity department of the company in November, 1950 and prior to his appointment as ad-manager he handled the company's literature division. In his post as Barber-Greene's Advertising Manager, Putz succeeds Wayne D. Adamson, Jr., who has resigned to accept a similar post elsewhere in the advertising field.

HENDERSON NAMED ZONE MANAGER— Warren E. Henderson, formerly Cleveland city sales manager for Dodge Division, has been appointed Cleveland Zone manager for Sherman Products, Inc., Royal Oak, Mich. His zone includes Ohio, West Virginia, western Pennsylvania and lower Michigan.

REILLY DISPOSES OF ITS NEWARK, NEW JERSEY PLANT — Reilly Tar & Chemical Corporation has sold its Newark, N. J. plant to Pitt-Consol Chemical Company, a New Jersey subsidiary of the Pittsburgh Consolidation Coal Company. This sale, according to Peter C. Reilly, Vice Pres., is part of Reilly's plan to divest itself of certain production facilities no longer germane to the principal line of products — concurrently, Reilly is expanding operations at other plants to take care of increasing demands. Eastern customers of Reilly Products will be served by the Eastern Division Sales Office at Tuckahoe, N. Y. with shipments from the Company's 14 other well located plants.

TWO PIONEER COMPANIES TO MERGE — Managements of American Steel Dredge Co. and American Hoist and Derrick Co. have reached an agreement, under which American Hoist and Derrick Co. will take over ownership and operation of the principal business and facilities of American Steel Dredge Co., Inc., at Fort Wayne, Ind. American Steel Dredge will become a division of American Hoist and the present American Steel Dredge products will continue to be manufactured.

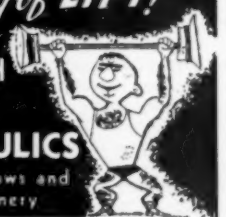
NEW MICHIGAN DISTRIBUTOR FOR CUMMINS — C. R. Boll, vice president—sales, Cummins Engine Co., Inc., Columbus, Ind., has announced the formation of a new Cummins Distributor for Michigan and the seven counties surrounding Lucas County (Toledo) in Northern Ohio. Name of the new firm is Cummins Diesel Michigan, Inc., and its headquarters is at 3601 Gratiot Ave., Detroit. Heading the new firm are: L. W. Childs, president, and J. S. L. Shales, vice president. Mr. Childs was formerly associated with the Cummins Distributor for Eastern Canada, Russell-Hipwell Engines, Ltd., at Owen Sound, in an executive capacity for 14 years. Mr. Shales was previously a sales engineer for Fairbanks-Morse Co. in Toronto.

NAMES TWO TO SALES POSTS. Jack McCann who has been serving as manager of the Washington, D. C. office of Le Tourneau-Westinghouse Co., Peoria, Ill. has been appointed government sales manager. Jack Errion, former advertising promotion supervisor has been named sales promotion manager.

NEW DISTRIBUTOR FOR GALION ALL-STEEL — South Texas Truck Equipment Co., 6 North Latham, Houston, Texas, has been appointed distributor with Houston, Texas areas for the Galion All-steel Body Co., Galion, O.

MARION NAMES NEW DISTRICT MANAGER — Marion Power Shovel Co., Marion, O., has appointed William H. McAllister, formerly in charge of sales in the Dallas, Tex. area, district manager for a five-state area embracing Kansas, Oklahoma, Nebraska, Colorado and the western half of Missouri. His office is at 1016 Baltimore Ave., Kansas City, Mo.

Plenty of LIFT!
with
MONARCH
POWER
HYDRAULICS
for Snow Plows and Road Machinery



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The HEP
"Dynamight"
ELECTRIC
POWER CONTROL

FITS ALL TRUCKS — is FAST and EASY to Install

Available for 6 or 12 Volt Systems

1000 lbs. pressure
1 gal. per minute volume

Fan Belt Models Also Available.

MONARCH ROAD MACHINERY CO.

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NEW DISTRIBUTOR FOR GALION ALLSTEEL — Transportation Equipment Co., 1354 St. Claire Ave., East St. Louis, Ill., has been appointed distributor by Galion Allsteel Body Co., Galion, Ohio, for Galion Allsteel products in southern Illinois and eastern Missouri.

AVERY TRACTOR, INC. TO HANDLE MICHIGAN LINE IN VERMONT — Avery Tractor, Inc., U. S. 20, West Lebanon, N.Y., has been appointed to sell and service the Michigan line of Tractor Shovels and Excavator Cranes, products of the Construction Machinery Division of Clark Equipment Co., according to an announcement by Clarence E. Killebrew, Clark vice-president. The distributor will handle Michigan products in the entire state of Vermont from a newly established office in Montpelier.

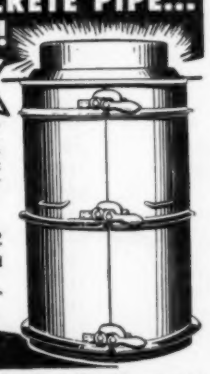
WRIGHT SUCCEEDS MOORE IN GASOLINE PUMP MANUFACTURERS ASSOC. — Theon Wright, vice president of H. A. Bruno and Associates, Inc., has been appointed managing director of the Gasoline Pump Manufacturers Association. Wright will succeed G. Denny Moore, who will retire as managing director, after nearly 25 years with the Association, but will remain as a consultant.

THEBAUT PROMOTED BY NEO-FLASHER — J. Clifford Thebaut, formerly district manager for the 11 western states for Neo-Flasher Manufacturing Co., 3210 Valhalla Drive, Burbank, Calif., has been appointed assistant general sales manager of the company with headquarters at 5615 North Richmond St., Chicago, Ill. He will supervise all rental and sales operations for the company, and will direct most of his efforts to the Midwestern and Eastern territorties.

12 NEW DEALERS APPOINTED BY CLARK — Twelve new dealers have been appointed to sell and service the Michigan line of tractor shovels and excavator cranes, products of the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich. These dealers are: R. C. Larkin Co., 3001 S. Wabash Ave., Chicago, Ill. Lake Shore Engineering Co., 1025 London Road, Duluth, Minn. Highway Equipment and Supply Co., 5100 Paxton St., Harrisburg, Pa. Shelton-Witt Equipment Corporation, 2231 Patterson Ave., Roanoke, Va. Mitchell Distributing Co., Inc., 5405 Hillsboro Road, Raleigh, N.C. to handle only Michigan tractor shovels in the entire state. Reagan Equipment Company, 333 Second Ave., North, Birmingham, Ala. Western Construction Equipment Co., 505 N. 24th St., Billings, Mont., to handle only Michigan tractor shovels. Miller Machinery Co., Highway 93 South, Missoula, Mont., to handle only Michigan tractor shovels. Moss Equipment and Supply Co., 3100 E. Yellowstone, Casper, Wyo. Columbia Equipment Co., 1240 Southeast 12th Ave., Portland, Ore. Evans Engine and Equipment Co., Inc., 1230 Westlake North, Seattle, Wash. in the entire Territory of Alaska. J. H. Ryder Machinery Co., Ltd., 201 Main St., South, Winnipeg, Man. in the entire Province of Manitoba.

FOR THE FINEST CONCRETE PIPE... YOU NEED FINEST FORMS!

THE Quinn Standard



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

• QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS
BOONE, IOWA

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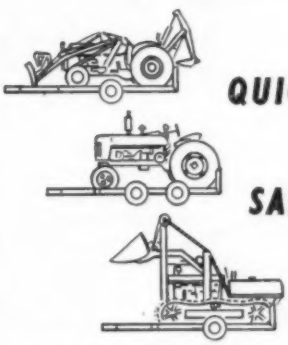
HAULETTE

America's Most Advanced Tractor Trailer



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FASTER and
SAFER HAULING

QUICK WAY TO GET YOUR EQUIPMENT ON THE JOB

It is only natural that Fayette, leading designers and manufacturers of trailer undercarriage assemblies, should engineer the finest trailer for easier and safer transport of tractors and tractor equipment. This being made possible by the patented features of the famous Fayette undercarriage design.

With Haulette you can quickly and safely haul equipment out in the field for contract work, demonstrating, picking up used tractors for service with the use of a light pickup truck.

Because you increase your efficiency with Haulette, it soon pays for itself in time saved and better service.

Ford Major Diesel safely supported and ready for hauling with light pickup truck at normal hauling speeds.

WRITE TODAY

FOR COMPLETE SPECIFICATIONS AND PERFORMANCE DATA.

FAYETTE MANUFACTURING CO., 600 MAIN ST., FAYETTE, OHIO

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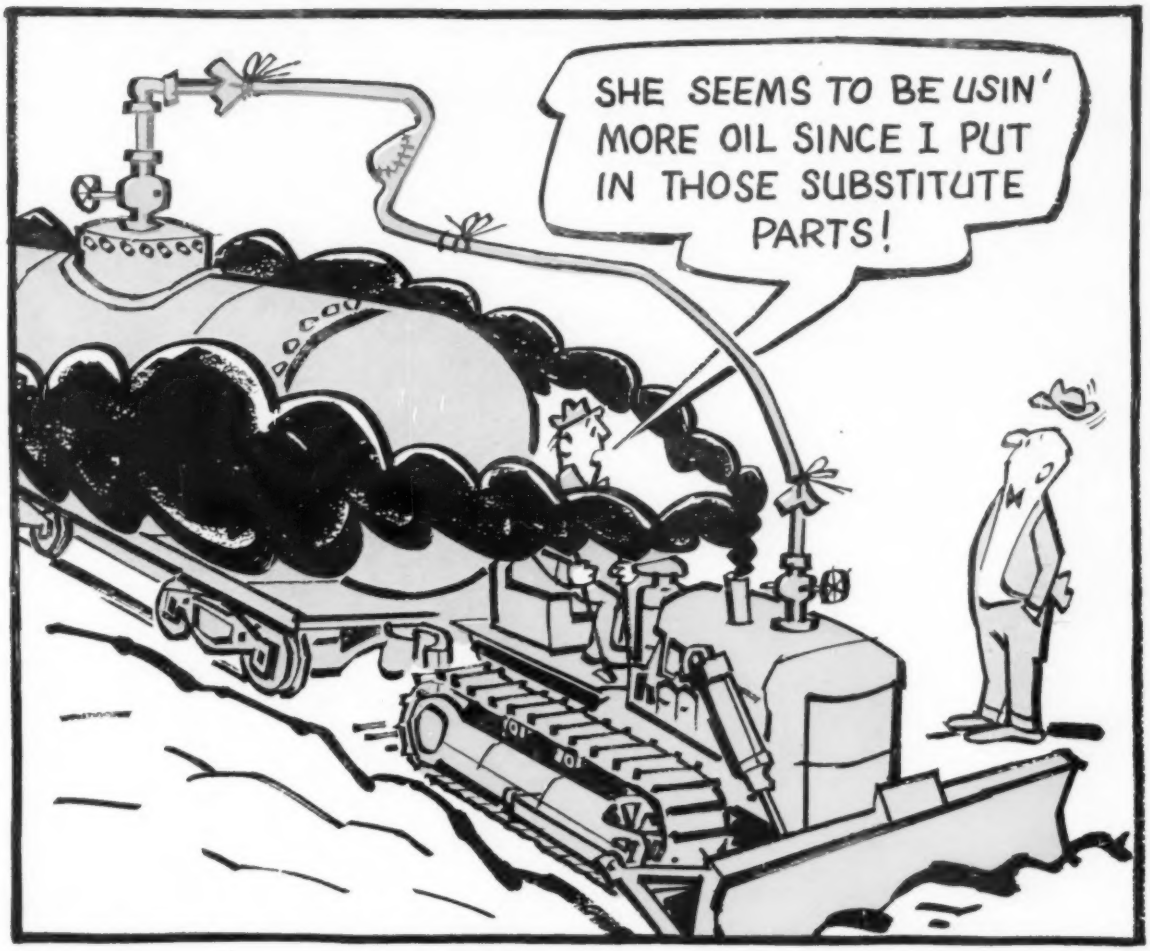

Chances are you'll never need to hook on a tank car to avoid down time. Chances are you *will* have to do something about cylinder liners at one time or other, though.

If you replace with a Caterpillar-built liner, you're sure of a liner made of a special nickel-molybdenum-chrome alloy that's tougher and stronger than steel, more resistant to heat and abrasion. You're sure of controlled induction hardening that makes bare surfaces highly resistant to wear, and of bores chemically treated for easier break-in —better seating of rings. You're sure of precision machining for smoothness, roundness and straightness the full length of the liner.

If you replace with a non-genuine liner, can you be sure of anything?

Better get Caterpillar parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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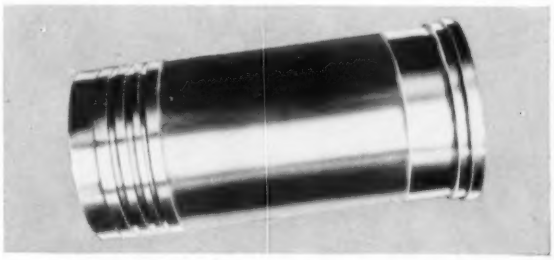

This is a genuine CAT® cylinder liner. As many as 14 different inspections guarantee its composition, strength and hardness.

CATERPILLAR*

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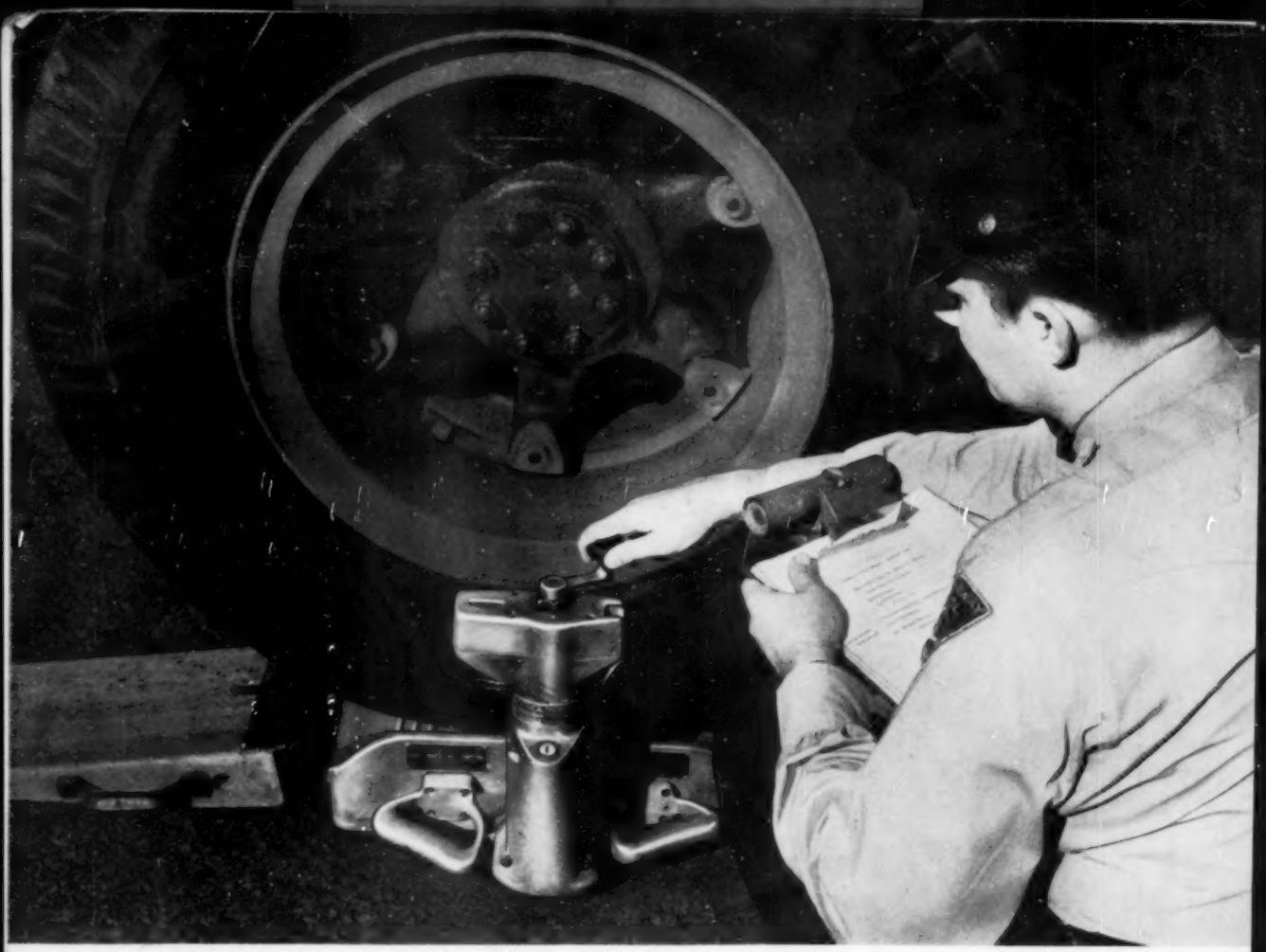
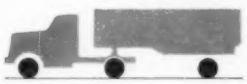


Profit without penalty!

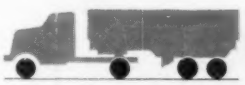
Want to carry bigger payloads and increase your materials hauling profit margin—without risking heavy fines for weight law violations? Then take a look at Galion Allsteel's new trailer dump line!

You'll find a model exactly suited to your job and the axle load limitations in your locality. With a full choice of body, hoist, chassis and running gear types and capacities at his disposal, your Galion Allsteel distributor can recommend a trailer dump with the best possible weight distribution—a unit that'll enable you to pile on extra pounds of profit-making legal payload.

To find out how much more your trucks can haul with custom-engineered Galion trailer dumps, see your Galion Allsteel distributor today. You'll be glad you did.



MODEL SSM—Best where local weight laws allow high individual axle weight limits, but relatively low gross weight limit.



MODEL STM—For use where weight laws allow credit for only one set of tandem axles, with medium gross weight limit.

MODEL TTM—Used in those areas where highway weight limit laws allow maximum credit for two sets of tandem axles.

MODEL HH—Ideal where laws permit "trains" and require wide axle spacing for maximum gross weight allowance.

DUO-SCOPIC

GALION ALLSTEEL BODY COMPANY GALION, OHIO

DIVISION OF HERCULES-GALION PRODUCTS, INC.

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